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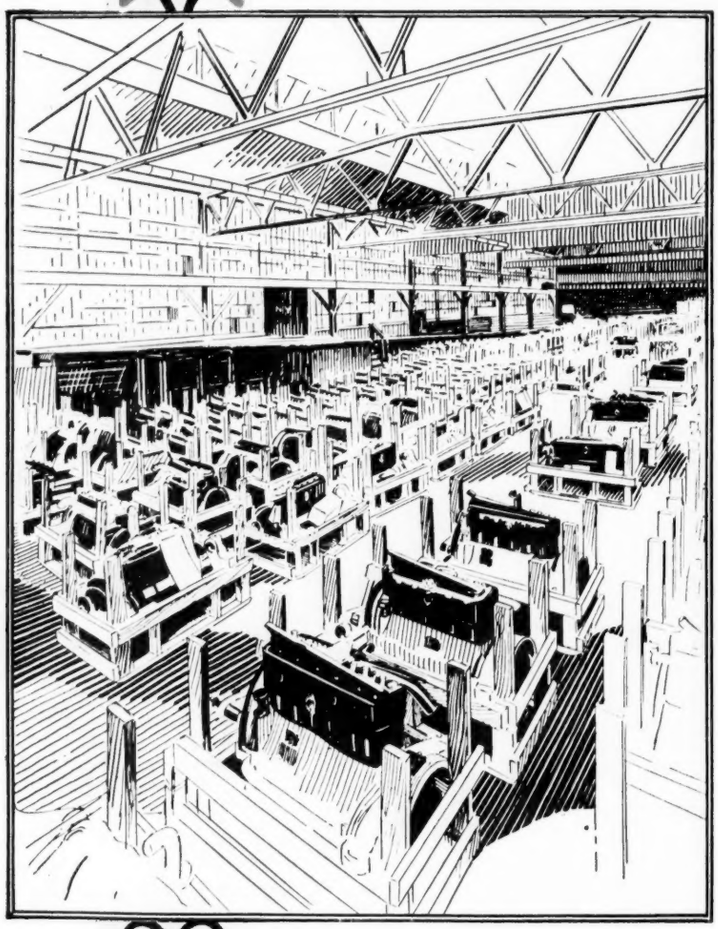

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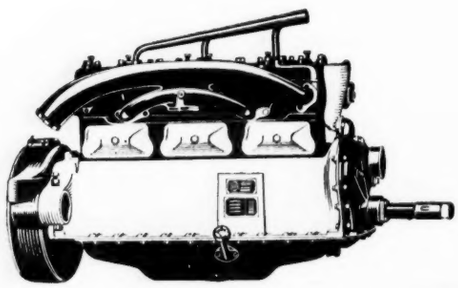

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Continental Motors

AUTOMOTIVE INDUSTRIES

VOLUME 56 *Philadelphia, Saturday, April 23, 1927* NUMBER 16

Industry's Spotlight is Turned on Traffic Problems

Five meetings in different parts of country last week devoted to questions of parking, signal systems, effect of congestion on car sales, etc.

AT no time since the conclusion of the sessions of Herbert Hoover's National Conference on Street and Highway Safety two years ago has the attention of so many automotive men been centered at a single time on traffic problems as it was last week when no less than five meetings were held in various parts of the country specifically devoted to discussion of traffic questions.

In all of these conferences automotive men played an important role, while in a majority of cases the gatherings were fostered and organized under the auspices of definitely automotive groups.

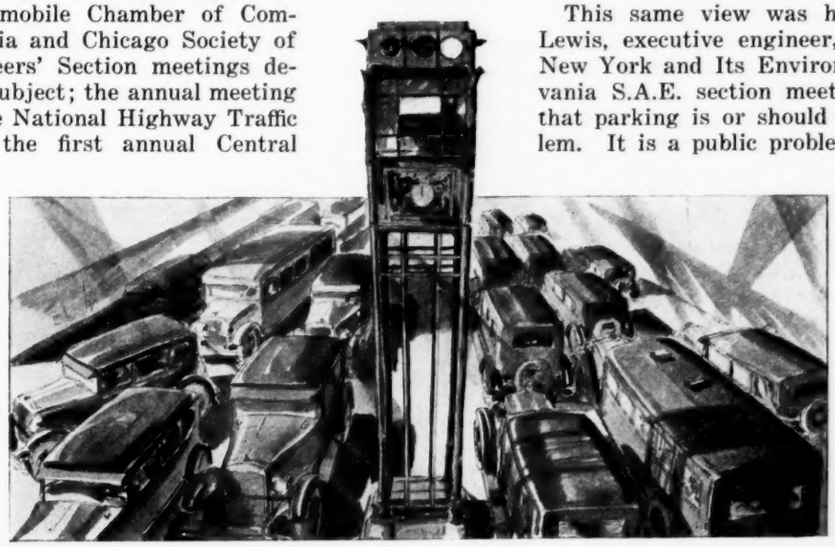
The varying shades of opinion on such important questions as parking, progressive street signals, standardization of regulations, possibilities and limitations of traffic education, speed laws and the relation between congestion and automobile sales are strikingly brought out by comparison of the views expressed at these various sessions. The meetings included a traffic conference of municipal officials, city planners and traffic engineers held in Chicago under the auspices of the National Automobile Chamber of Commerce; Pennsylvania and Chicago Society of Automotive Engineers' Section meetings devoted to the same subject; the annual meeting in New York of the National Highway Traffic Association; and the first annual Central States Safety Congress held in Kansas City.

An apparent trend toward general agreement among the experts on certain important points is revealed by study of the views expressed at these diverse gatherings, despite the clear evidence of widely divergent views still in existence on many others. As regards parking privileges, the superiority of the progressive over the synchronized signal system, the necessity for a detailed statistical traffic survey in every city, and the need for present street construction for future needs, there is little radical difference of opinion.

The public streets and highways in congested sections cannot be expected to take care of parking, in the opinion of several close students of traffic problems who talked at last week's sessions. That was one point on which there seemed to be agreement.

At the N.A.C.C. conference, for example, the development of day storage facilities at rates as low as 25c per day were strongly urged by J. Rowland Bibbins and several other speakers, while the N.H.T.A. committee which had investigated this subject felt quite definitely that a business in the future must provide for the loading and unloading of vehicles and for their storage on private property, or else decentralize by opening branch establishments in outlying sections.

This same view was held by Harold M. Lewis, executive engineer, Regional Plan of New York and Its Environs, at the Pennsylvania S.A.E. section meeting, when he said that parking is or should be a private problem. It is a public problem to provide highways upon which vehicles may be operated, in Mr. Lewis' opinion, but the task of supplying places where the vehicles may be stored while the owner is transacting his business is a strictly private one and should be cared



for by private capital. Certainly, Mr. Lewis thinks, the public streets should not be used for this purpose. All large stores, apartments, office buildings, etc., he says, should provide private unloading spaces inside the building lines.

At the Chicago meetings, however, it was pointed out quite clearly that the prohibition of parking is almost as unpopular as another well-known type of prohibition and almost as difficult of enforcement.

But parking was only one of several vital traffic questions which came in for special analysis. Some highly enlightening thoughts on the possibilities and limitations of educational work as an aid to traffic safety and facilitation of traffic movement also were propounded. Particularly interesting were the comments made on this subject at the Kansas City session by Miller McClintock, director of the Albert Russel Erskine Bureau for Street Traffic Research.

"Complex of Conflicts"

"The traffic problem in the typical American city," Dr. McClintock said, "is a complex of conflicts between street cars and automobiles, between automobiles and other automobiles, between pedestrians and automobiles, and between pedestrians and pedestrians. These infinite conflicts result in something like friction, and cut down the speed and safety of all traffic movement.

"There is no single panacea for so complicated a situation. In fact it may be said that there is no solution for the traffic problem. There is however a series of reliefs for it.

"It is necessary to make a minute investigation of the sources of friction and to treat each individual contributor to the general problem in an individual and specific manner.

"The issuance of appealing slogans such as 'Don't Jay Walk,' 'Always be Careful,' 'Safety or Sorrow,' and others can have but little effect unless backed by a sound engineering study on which definite engineering recommendations are based to eliminate traffic conflicts."

Dr. McClintock pointed out that safety education was an important feature of traffic control, but that authorities should base their education on sound principles applied to specific instructions.

"The man who would solve the street traffic problem by the statement that all that is needed is education might properly be asked what this education is to consist of. A teacher in a university who should attempt to conduct a class in Municipal Administration by a series of slogans such as 'Public officials should be honest,' 'Public officials should be economical,' 'Public officials should be efficient,' would not impart a great deal of information to his students as to principles of municipal administration.

"Before the public can be educated in methods of street traffic operation which will relieve congestion and add to safety it is first necessary to develop the principles that should be taught. Once careful investigation in each particular city has been made there can be formulated a simple and uniform code of traffic regulation. Until this is done vague and general educational programs on public safety matters related to traffic can be of little value."

That very considerable values can be obtained through pedestrian and driver education, however, was shown by Prof. L. W. McIntyre, University of Pittsburgh, who told the N.H.T.A. of the work being done along these lines in Pittsburgh. Accidents during the first two months of this year, Prof. McIntyre said, show a decrease of 8 per cent over the corresponding period of 1927. The work, he stated, includes advertising and educational meetings aimed at both children and adults. He emphasized the importance of pedestrian education by citing statistics to show that pedestrians are at fault in more than 50 per cent of the fatal accidents in which they are involved.

The discussions at the N.A.C.C. meeting in Chicago centered almost wholly around the automobile in its various relations to the economic and social welfare of the community.

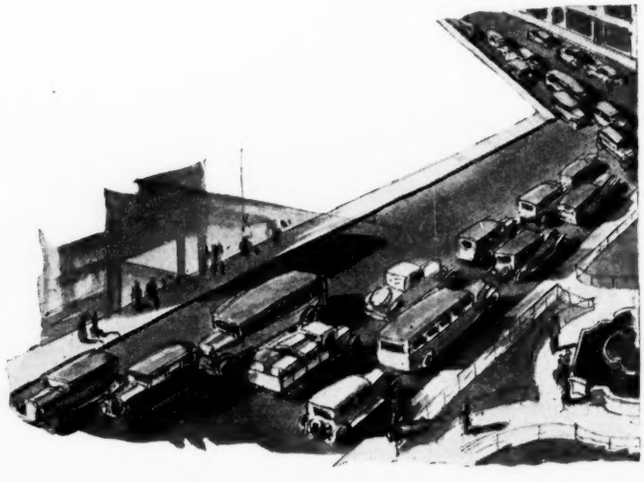
There was a noticeable departure from the suggestions of restrictive control of motor vehicles such as used to feature any gathering of this kind, and a distinct turning of minds toward facilitating the movement of passenger cars and trucks for the greater convenience and safety of the public.

The same attitude marked the traffic session of the Chicago section of the Society of Automotive Engineers held on the evening preceding the opening of the N.A.C.C. conference.

These conferences revealed that city authorities and planners are deeply concerned with providing for the adequate movement of motor vehicles 10 and 25 years from now and that they consider many of the regulations of today experimental and temporary. It was shown that the speed problem in the "downtown" and congested business areas of large cities is not one of restriction but rather of getting vehicles through at an average rate of better than 6 to 10 miles an hour. Nowhere are city streets being made to carry the maximum volume of motor traffic that they are capable of, the authorities agreed, and Dr. McClintock, who talked also at the N.A.C.C. meeting, as well as at the Kansas City meeting, told how a new system of control put in effect in Los Angeles following a traffic survey resulted in a 50 per cent increase in traffic with a 20 per cent reduction in accidents.

Signal Light Control

Traffic control by signal lights was discussed and it was generally agreed that where such lights are installed and operated in accordance with a careful study of the requirements the results are good, but that often such lights merely serve to slow up and confuse traffic. At the S.A.E. meeting Carroll E. Robb of the National Safety Council stated that the synchronized traffic lights often have actually slowed up traffic, but that the progressive light signal system used in the Chicago loop has speeded it up and greatly increased the capacity of the streets. He cited observations made by representatives of the National Safety Council and the Chicago Surface Lines to substantiate this statement.



The presiding officers of the three sessions of the N.A.C.C. conference were Edward S. Jordan, president Jordan Motor Car Co.; P. L. Emmerson, Yellow Truck & Coach Mfg. Co., and Alvan Macauley, president Packard Motor Car Co. These executives were among the interested cross-questioners of the speakers who included Dr. McClintock, E. J. McIlraith of the Chicago Surface Lines; J. Rowland Bibbins, consulting engineer, Washington, D. C.; Eugene S. Taylor, manager Chicago Plan Commission; Robert Kingery, Chicago Regional Planning Association; H. B. Peabody, Detroit Garages, Inc., and Judge Charles L. Bartlett of Detroit.

Essentials of a Survey

The essentials of a traffic survey, according to Dr. McClintock, are:

1. Count vehicles at points of greatest traffic flow. In smaller cities counts made between the hours of 8 and 10 a.m. and 4 and 6 p.m. are sufficient. In Chicago the count was continuous from 7 a. m. to 11 p. m.

2. Analyze the points of congestion as to kinds of traffic, origin, destination and other factors.

3. Make an accident survey based on statistical report covering continuous period for as long a time as it is available.

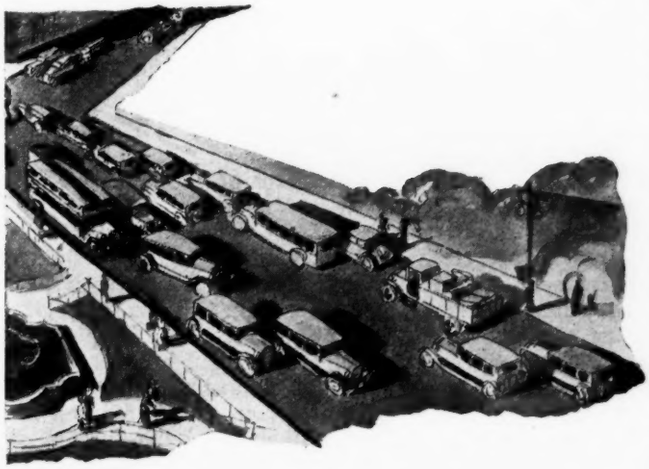
4. Study parking and where it is found that street storage interferes with activity, storage must give way. Parking should be permitted where it does not interfere with traffic.

An interesting feature of the Chicago traffic survey was the interviewing in one day of 96,000 customers in loop department stores. It was found that 8 per cent came to the stores by automobile but only 1.5 per cent had been able to park their cars at the street curb.

Mr. McIlraith said that he has found many instances of stop and go signal lights having been installed at intersections where the volume of traffic does not justify them and where they serve only to slow up motor vehicle movement. He suggested that, in cases where traffic is heavy only at morning and evening peaks, these lights be allowed to operate as stop and go signals only for limited time and then turned off, leaving only a caution light showing.

It was brought out that in the Chicago survey automatic signal lights were recommended only for intersections where in 16 hours 16,000 or more vehicles pass, of which not less than 25 per cent are using the street of lesser travel.

Where a number of contiguous street intersections are tied up in a signal light system Mr. McIlraith recommended the progressive type as against the synchronized type. A properly timed progressive system, he said, will permit vehicles to move clear through the system without a stop if they travel at the moderate speed for which the system is set. On the other hand, he said, where the synchronized system is used the tendency is for cars to speed in the effort to pass as many as possible of the intersections before the lights show stop. In the progressive system speeding merely results in the car being stopped because of arriving at the next intersection too soon.



Mr. Bibbins advocated the planning of streets and boulevards to take care of twice the present volume of motor traffic.

The N.A.C.C. conference adopted a resolution calling upon municipal and state highway authorities to adopt the standard direction signal shapes and colors recommended by the Hoover conference on street and highway safety.

Facilitation of vehicular traffic, safety, compulsory insurance and legal limitations on the weight, dimensions and speed of motor vehicles were among the important points covered in the committee reports which made up the program of the National Highway Traffic Association convention.

A technical traffic survey is an essential preliminary to the installation of an electrical traffic control system, according to Col. I. C. Moller, whose views in this regard coincided with those of speakers at several of the other meetings. Where the system is installed without such a study, the frequent result is that congestion is not relieved to the extent expected and traffic is likely to be considerably slowed down instead of being facilitated. Col. Moller stated that electrical control systems, properly installed and operated, were becoming generally recognized as a final solution of traffic regulation.

The synchronous method of operating the lights also was opposed by Mr. Moller. This system, he believes, is becoming obsolete in most large cities and its place is being taken by the progressive or coordinated systems.

Yellow Light Confusing

The confusion existing in the public mind regarding the meaning of the yellow light was brought out and the N.H.T.A. passed a resolution urging municipalities to carry on experiments to determine the best use of this color. Col. Moller urges that yellow should mean that the signal is about to change and that the intersection should be clear.

The desirability of having signals operate only when traffic conditions demanded, particularly in outlying sections, was emphasized by Col. Moller also, as was the undesirability of installing them initially where a scientific study of traffic would show that they were unnecessary. He also urged the formulation and general adoption of uniform regulations covering the use of electric traffic signals in congested areas to eliminate the confusion now existing.

New York City is to have an elevated highway extending from Canal Street north along the Hudson River and connecting with Riverside Drive. The roadway will provide for high speed traffic in three lanes in each direction, the area underneath being used for slower speeds. The design will be such that later another deck of the same width can be added, at which time each deck will be used for one-way traffic only. Ramps to the roadway will be erected at intervals of about 2/3 of a mile. Each roadway will have a capacity of 9000 vehicles per hour as compared with the present maximum on Fifth Avenue of 3200. This information was presented by Arthur S. Tuttle, one of New York City's engineers,

who expressed the opinion that if several such roadways were made available they would be filled immediately by traffic which is now repressed because of congestion, which certainly is an interesting thought from a sales standpoint.

The new standard safety code for brakes and brake testing, which has received widespread support, was presented by H. H. Allen of the U. S. Bureau of Standards and received the indorsement of the association.

Inasmuch as road stress is a function of wheel load, a committee headed by David Fenner, International Motor Co., reported that wheel load and not gross weight should be made the basis of legal limitations on vehicles. The committee recommended that on state highways the wheel load should not exceed 9000 lb. and in congested areas should be increased to 12,000 lb. Tires should provide an inch of width measured at the flanges, for each 800 lb. load.

In regard to axle spacing, the committee stated that tests had shown that road stress is not affected by this dimension and if a limitation is to be placed on axle spacing, the minimum should not be more than 36 in. If thought necessary to protect bridges, the committee recommended a gross weight limitation of 26,000 lb. on four wheels and 42,000 lb. on more than four wheels, except in congested areas, where these limits should be raised to 36,000 and 63,000 lb. respectively.

The committee on compulsory insurance believes that some method of making motorists financially responsible for any damage they may do is going to be generally adopted, a view somewhat at variance with that of most automotive organizations at this time.

In regard to speeds, George H. Pride, of the Pride Transportation Co., said that speed limits should be increased as improvements are made in braking systems in order to encourage development. He also stated that truck acceleration and hill-climbing ability should be improved so that this vehicle could maintain its place in the traffic stream.

Harold M. Lewis, talking at the Philadelphia S.A.E. session, pointed out that although many of the main streets in the larger cities are now utilized almost, if not quite, to their capacity by vehicles, the number of such vehicles is sure to increase in the future, so that unless steps are taken at once to remedy the condition the sale of automobiles in the future may be seriously prejudiced.

The wave or platoon system appears to Mr. Lewis to be about the best method of regulating traffic, but this system is more applicable to one-way streets than to others. Such a plan properly installed on one-way streets not only speeds up traffic considerably but makes operation of vehicles and the movement of pedestrians safer.

Traffic Officer Best Yet

In congested business centers there has been nothing developed yet which adequately takes the place of an intelligent traffic officer stationed at each corner to regulate traffic flow according to conditions.

Proper segregation of traffic is an essential factor in eliminating congestion, Mr. Lewis said. Zoning ordinances which would restrict all business requiring heavy trucking to definite city locations is one way in which this can be brought about.

Another plan already being employed in some sections of Long Island is the Community Cell scheme. In this plan individual communities containing all necessary features of community life are grouped about a community center but the entire project is so laid out with respect to main thoroughfares that all through traffic is completely bypassed around the community, the roads in the community being employed only to serve the needs of the residents.

In cities the elimination of sidewalk crossings, either by the use of overhead crossovers or by arcading the buildings so that sidewalks are inside the building lines is another scheme which would be a large factor in eliminating congestion.

All of these suggestions of Mr. Lewis point to the necessity of regional planning so that all the factors involved may be studied and a solution found which will best meet the requirements of the situation.

Seville-Buenos Aires Air Line

BY a royal decree, the Sociedad Colon Transaerea Espanola is authorized to establish a service by dirigibles between Seville and Buenos Aires. The airships will have a minimum carrying capacity of 40 passengers and 10 tons of cargo. The company is required also to establish in due time, and under conditions which will be specified, a service, at least weekly, between Seville and the Canary Islands, with dirigibles capable of carrying 16 passengers and a ton of cargo.

The Colon company will have a monopoly on aerial service between Spain and the Argentine Republic for a period of 40 years. Thereafter the contract will be prolonged automatically for 10-year periods unless one or the other party to it gives notice of discontinuance one year in advance.

The company will build at Seville, at its own expense and without any Government assistance, within a period of four years, an airport complete with hangars, generating station for hydrogen (or any other gas which may be adjudged technically superior), gasometer, workshops, store houses, radio station, weather bureau, landing equipment, etc.

The air service between Seville and Buenos Aires must be inaugurated within four years from the date of approval of the constructions above outlined. A regular monthly service in both directions will be organized, and it will be turned into a semi-monthly or weekly service if the requirements for the mails exceed the 10 tons provided for.

The Government will pay to the company a sum of 500,000 pesetas for each successful trip. The payments thus made shall not exceed 6,000,000 pesetas in any one year. When the sums thus paid have attained 30,000,000 pesetas the Government shall be relieved of any further payments and become owner of the complete installation at Seville, which will be pledged to the operating company until the expiration of the contract.

The obligations assumed by the Government under this contract will become void in case of failure of the service, in the judgment of the Minister of Labor, of Commerce and Industry. If the contract should be declared void for this reason, the Government, after an appraisal, will acquire the installation at Seville; the sum to be paid by the Government in no case shall exceed 30,000,000 pesetas, inclusive of the sums already paid on successful trips.

During the first four years of operation of the company, 30 per cent of the personnel, ground or flying, permanent or transient, technical or administrative, of the enterprise may be of other than Spanish or Argentine nationality. After that period at least 90 per cent of the personnel must be of either Spanish or Argentine nationality. The navigating personnel must be specially approved by the Minister of Labor, Commerce and Industry. The airport and the line of dirigibles will operate under Government control.

Just Among Ourselves

Now the Horses Know How it Feels

O TEMPORA! O Mores!—which being interpreted means "things ain't what they wuz once." Listen to this one from an article in *The Spokesman and Harness World*, dated March 1, 1927: "The District of Columbia Court of Appeals has sustained the hard-fought traffic regulation forbidding the driving of horse-drawn vehicles on Sixteenth Street, Washington, D. C., except for the purpose of delivering merchandise. The Court held that the intent of Congress would be frustrated if slow-moving vehicles such as horse-drawn wagons, solid-tired trucks, etc., could not be excluded from such highways." Then cast memory backward to these sentences from the November, 1899, issue of our direct ancestor, *The Automobile*: "The first automobile to enter Central Park, New York, did not go far on this occasion, as the policeman at the Fifth Avenue entrance soon turned it in the direction of the magistrate's office. Automobiles have been excluded from Central Park by Park Commissioners, while permitted on the drives in other parts of the city under the control of the commissioners..... This automobile which has so boldly defied the commissioners is a light electric phaeton and the only objection that can possibly be raised against it is that it has no horse in front of it."

* * *

Old Records Sound Pretty Good Today

DESPITE the smiles which inevitably come from perusal of pages recording the ideas and achievements of the motor vehicle promoters of 25 and 30 years ago, a real undercurrent of admiration for both the courage and performance of those pioneers comes to us every time we spend half an hour in such roaming. We were particularly impressed, for example, on this last journey through the past with a note which appeared in this same 1899 issue of *The Automobile* telling of the run made by J. W. Stocks over the 400 miles between Edinburgh and London in 20 hours and 35 minutes. That seems to us to have been a very remarkable achievement at that time with the types of vehicle available. There are some average stock car drivers today who think twice and pull themselves together before they set out on a continuous 400 mile journey to be made in a little over 20 hours under modern traffic conditions. It is interesting to read also of a kilometer (.62 of a mile) having been made in 47 4/5 seconds by Genetzy in Paris, April 29, 1899.

* * *

Day of High-Pressure Salesmanship is Passing

AMONG the changing tides of distribution which today are washing over industry in general and the automotive industry in particular, there is one which becomes more interesting to watch all the time. The day of supersalesmanship, high-pressure selling and "efficiency"—in the worst sense of those words—seems to be waning. It is good to note definite signs of a new order flashing up here and there along the industrial road. There is beginning to be a tendency to help the prospect to buy instead of trying to "high-pressure" him into purchasing; a tendency to make buying easy, to get the prospect to want to buy and thus to permit him a lasting satisfaction in a decision well made rather than the possibility of regret at a decision somewhat unwillingly hurried. High-pressure merchandising hasn't passed, of course, but there are indications that something fundamentally more powerful may eventually take its place.

British Car Makers Expanding Their Markets

THE steady growth of autobile use outside the United States is reflected in the increased business being done by British manufacturers as well as by the rising registration totals in all parts of the world. Great Britain in 1926 for the first time exported more automobiles than it imported; this despite the fact that the number built for domestic consumption also exceeded the 1925 total. Last year, according to figures by the Society of Motor Manufacturers and Traders, Ltd., British manufacturers built 1,032,000 motor vehicles for domestic consumption and exported 33,237. Imports were 23,211. While increased British activity and competition undoubtedly will make the going harder for American makers in some markets, the development of the whole foreign field is still so much in its infancy that the greater urge to motor vehicle use brought about by greater sales activities in general probably will help more than increased competition will harm in the long run.

* * *

Rubber Coming Into Use in Steering Wheels

RUBBER continues to insinuate its way into more parts of the modern motor car. Just heard the other day that development work is being done in connection with the use of steering wheel hubs having rubber inserts which provide complete non-metallic insulation for the steering wheel. Just how soon anything of this kind will reach the production stage, is a bit difficult to tell, but it wouldn't be surprising if some device of this sort made its appearance on one or more motor cars within the next few months.—N. G. S.

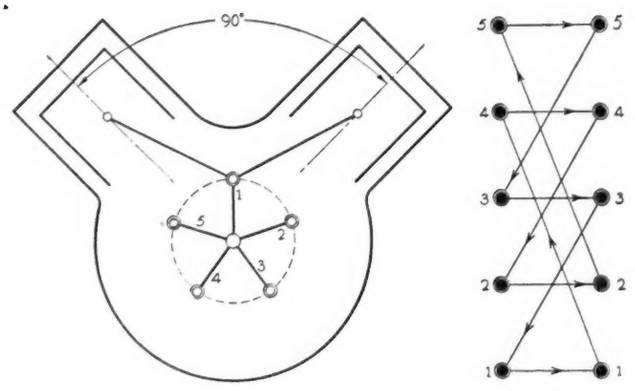


Fig. 1. Diagram of a 10-cylinder 90 deg. V engine and its firing order

Balance Conditions 90-Deg.

In engine of this type primary inertia can be completely balanced, a horizontal recip

By P. M.

THE problem arose some time ago as to the balance conditions in a 10-cylinder 90 deg. V-engine of the double sleeve valve type, the balance of both the crank trains and the sleeves being involved.

It was pointed out in a paper prepared by the author about a year ago that in a four-cylinder sleeve valve engine the sleeves are not in balance but form a rocking couple, and it has been suggested that possibly this rocking couple could be eliminated by the use of a larger number of cylinders, say ten. The following analysis of the balance conditions of this particular type of engine may be of interest as an illustration of the methods of working out such problems.

In the first place it may be pointed out that lack of balance of sleeve motion is not confined to a four-cylinder engine, but is characteristic of all vertical engines with the conventional crankshaft arrangements. In all such engines the pistons in the two end cylinders reciprocate in phase, so that their inertia forces have a resultant acting vertically along a line at the middle of the length of the engine, which can be balanced or neutralized by the resultant of the corresponding forces in two or more other cylinders also located symmetrically with respect to the longitudinal center of the engine. The valve sleeves in the two end cylinders, on the other hand, move at all times in direct opposition and form a rocking couple. Other pairs of symmetrically located sleeves also form rocking couples which differ from the first both in magnitude and in phase and therefore cannot balance it.

This applies to four, six and eight-cylinder vertical engines, and the general principle is not even limited to the sleeve valve type of engine, for in a poppet type of engine, when the exhaust valve in No. 1 cylinder, for instance, is lifted, and its inertia produces a certain reaction on the engine frame, there is no other simultaneous motion which could possibly balance this.

It is worth pointing out in this connection that these different inertia forces are of rather different orders of magnitude and therefore of different degrees of importance. A valve sleeve may weigh as much as a piston, but its range of motion is only about one-fourth as great, while its rate of reciprocation is one-half as great as that of the crank train, hence the inertia forces acting on it will be only about one-eighth as great. The weight of the poppet valve and its lift in turn are much smaller than the weight and stroke of the valve sleeve, respectively, and the inertia forces, therefore, are very much smaller in the case of the poppet valve.

With 10 cylinders, a 90 deg. angle of V will give unequally spaced explosions, which is undesirable, but this angle is chosen because it makes it possible to completely balance the primary inertia forces due to the crank train members, which are the most important of the various unbalanced forces. There will evidently be 10 explosions or power impulses in two complete revolutions or 720 deg. of crank motion, making the average interval between explosions 72 deg. However, the two cylinders whose pistons act on the same crank will ignite at an interval of 90 deg., hence the interval between the second explosion in one pair of cylinders and the first explosion in another pair will be

$$(2 \times 72) - 90 = 54 \text{ deg.}$$

Since the angle of V is 90 deg. the primary forces on the crank train masses can be balanced by suitable counter weights secured to the crank arms, the

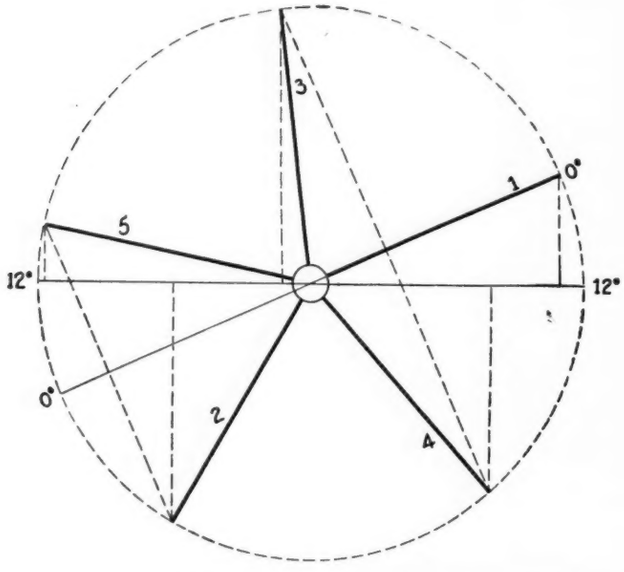


Fig. 3. Diagram for determining instantaneous values of secondary forces for different pairs of cylinders *(see page 614)*

in a 10-Cylinder *V*-Engine

forces of pistons and associated parts while secondary forces form rocating couple.

Heldt

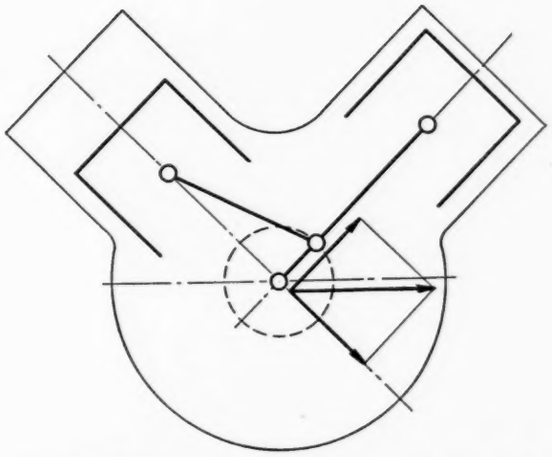


Fig. 2. Diagram showing how secondary inertia forces of one pair of cylinders combine to produce a horizontal reciprocating force

balance being complete only if opposite cylinders have their axis in the same transverse plane. The primary force on the reciprocating weights in any cylinder is a harmonic force acting along the axis of that cylinder, but the two forces on the reciprocating weights in one pair of cylinders combine to produce a force of constant magnitude, rotating uniformly at crankshaft speed, which can be neutralized by the centrifugal force on a pair of counter weights secured to the crank arms.

If instead of the 90 deg. angle of V, we used a 72 deg. angle in order to secure uniformly spaced explosions, the primary forces due to one pair of reciprocating parts in the same plane would be a variable rotating force which could be represented by an ellipse, the longer vertical axis of the ellipse being proportional to the cosine of 36 deg. (0.809) and the shorter, horizontal axis proportional to the sine of 36 deg. (0.588), and only the minimum value of this force, represented by the horizontal axis, could be completely balanced by means of a rotating weight.

The secondary inertia forces, on the other hand, are not so readily disposed of. Since the angle between cylinder axes is 90 deg. and since the secondary inertia forces have twice the frequency as the crank motion, the phase difference between the secondary forces on the two sets of reciprocating parts in a pair of cylinders is 180 deg. or half a cycle. In other words, these forces are always equal in magnitude but opposite in direction with respect to their cylinder axis. For instance, if in the right-hand cylinder of a pair the secondary force is at its maximum and upward along the cylinder axis, in the left-hand cylinder it will be also a maximum but directed downward along the axis of this cylinder. Hence the two secondary forces on the reciprocating parts of one pair of cylinders combine to form a horizontal reciprocating force as indicated by the diagram Fig. 2. The effect is the same as in the conventional eight-cylinder 90 deg. V-engine with single-plane crankshaft, in which the secondary forces on the reciprocating parts of all four pairs of cylinders are always in phase and therefore add together.

Now, in the 10-cylinder engine we have five such harmonic forces corresponding to the five pairs of cylinders. All of these act in the same horizontal plane, but along different lines, at distances one from another equal to the cylinder spacing. Moreover, the five forces are not in phase; between the forces on the reciprocating parts in adjacent pairs of cylinders there will be a phase difference equal to twice the angle between the cranks corresponding to these two cylinders, that is, of 144 deg. We know that the secondary force is at a maximum in the upward direction when the piston is at the top end of the stroke. Now let the piston be at the top end of the stroke in the right-hand cylinder of a pair (looked at from the front of the engine). Then the secondary force in this cylinder is upward along the axis of this cylinder, while the secondary force on the parts in the other cylinder of the pair is along the axis of that cylinder and downward, and the resultant of the two is horizontal and to the right.

The problem now is to combine the harmonic forces on the five pairs of reciprocating parts, which forces are out of phase with each other and act along different lines. Since all are harmonic forces and since the phase differences between the forces on parts in adjacent cylinders is 144 deg. we may represent them by the following expressions:—

Set 1	Set 2	Set 3	Set 4	Set 5
$A \cos \phi$	$A \cos (\phi + 144^0)$	$A \cos (\phi + 288^0)$	$A \cos (\phi + 432^0)$	$A \cos (\phi + 576^0)$
which, simplified, gives,				
$A \cos \phi$	$A \cos (\phi + 144^0)$	$A \cos (\phi + 288^0)$	$A \cos (\phi + 72^0)$	$A \cos (\phi + 216^0)$

The base line from which the angles are measured will then be the axis of the right-hand cylinder. It is assumed that crank No. 2 is set ahead of crank No. 1 in the direction of rotation by 72 deg.; crank No. 3 ahead of crank No. 2 by the same amount, etc.

We know that when the crank is in the zero position thus determined the secondary force on the reciprocating parts in the No. 1 pair of cylinders is at its maximum and toward the right. The simultaneous val-

ues of the secondary forces on the reciprocating parts in the other four pairs of cylinders we can determine as follows (Fig. 3): We draw a circle of a radius representing the maximum value of the secondary force on one set of reciprocating parts (two cylinders), and draw five equally spaced radii representing the phases of the secondary forces on the reciprocating parts of the five pairs of cylinders. The angle between the forces on the reciprocating parts in cylinder pairs Nos. 1 and 2 is 144 deg.

Then, by projecting perpendicular lines from the ends of these radii upon the base line 0-0, the lengths set off on this base line by the different perpendiculars represent the values of the secondary forces in the corresponding cylinders. Some of these forces, like that on the parts of No. 1 pair of cylinders will be positive, that is, they act toward the right, while others are negative and act toward the left.

All of the five forces are drawn in Fig. 4, along lines at distances apart equal to the cylinder spacing. By taking moments around the points of application of the forces on the parts in the end cylinders we find that this system of forces is equivalent to a couple of the magnitude indicated by the inclined line.

Similar diagrams have been drawn for crank positions 12, 24, 36, 48, and 60 deg. further on. It will be seen that for the 12 deg. crank position, Fig. 5 (24 deg. advance in the phase of the secondary forces), the couple is in the same direction and somewhat larger, while in the 24 deg. crank position the couple is materially smaller, which indicates that it reached its maximum somewhere between the 0 and 12 deg. positions. As nearly as can be determined graphically, the maximum value is reached when the crank has traveled 10 deg. from the zero position. This rocking couple in the horizontal plane passes through a complete cycle during every half revolution of the crankshaft, as shown in Fig. 6.

Next it is necessary to gain some idea of the magnitude of this rocking couple. The maximum secondary force for the reciprocating parts in one cylinder, which can be determined by methods given in books on the gasoline engine, may be denoted by *F*. Then, since the secondary forces on the part in the two cylinders of a pair reach their maximum values simultaneously but act at right angles to each other, their resultant is equal to 1.41 *F*. We may assume that the cylinder center distances are alike and may represent this distance by *D*. The distance between the forward and rear cylinder axis is then 4*D*, and if the secondary forces in these two pairs of cylinders reached opposite maximum values simultaneously, the value of the couple due to these forces alone would be 5.65 *FD*. Actually the maximum couple due to the secondary forces on all five pairs of reciprocating parts is only about 4.8 *FD*. This is the maximum value of the rocking couple in the horizontal plane, which passes through one cycle during each half of a crankshaft revolution.

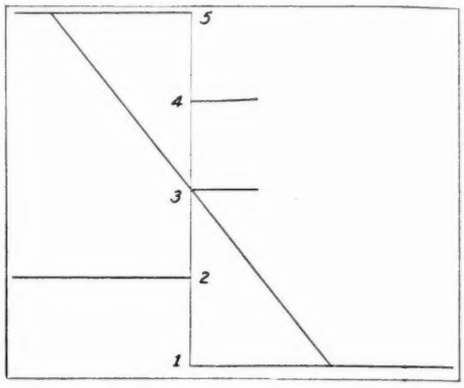


Fig. 4. Couple produced by secondary forces with crank in zero position (in line with No. 1 right hand cylinder axis)

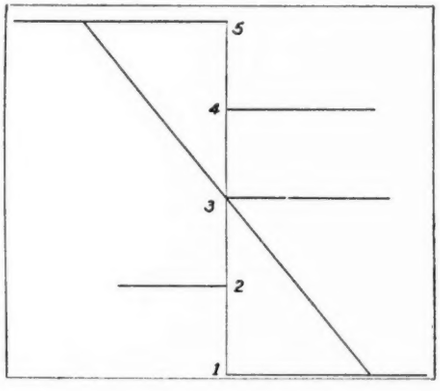


Fig. 5. Couple produced by secondary forces 12 deg. of crank motion from the zero position

It remains to investigate the unbalanced forces on the valve sleeves. The primary forces on like valve sleeves in one pair of cylinders evidently combine to make a constant rotating force around the crankshaft axis, the force making one complete revolution for two revolutions of the crankshaft. When the force in the plane of cylinder pair No. 1 is in the upward direction, that in the plane of cylinder pair No. 3 is 72 deg. further on in the right-hand direction, being nearly horizontal toward the right. The force in the plane of cylinder pair No. 5 is 144 deg. further on; that in the plane of cylinder pair No. 2, 216 deg., and that in the plane of cylinder pair No. 4, 288 deg. farther on as represented in Fig. 5. The force on each of the intermediate pairs of sleeves can be resolved into components acting at the points of application of the forces on the outer or end pairs of sleeves.

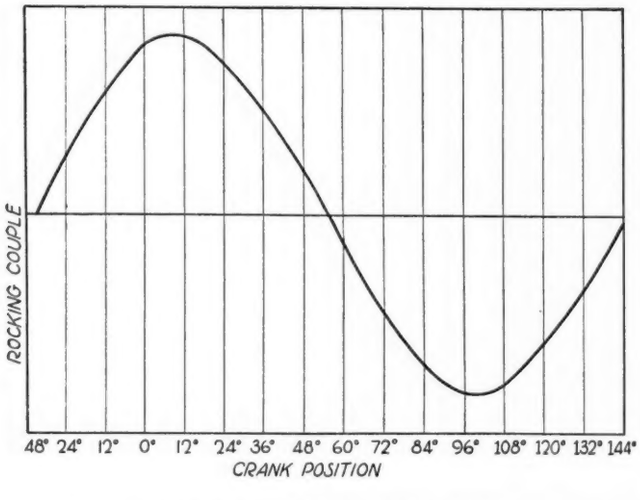


Fig. 6. Horizontal rocking couple due to secondary forces, plotted against crank position

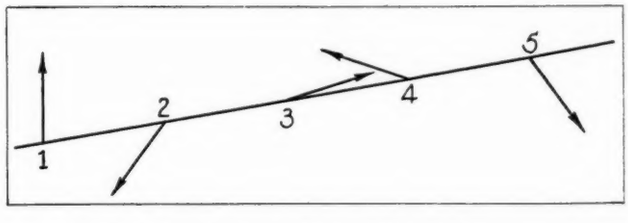


Fig. 7. Showing angular relations between primary forces on sleeves of different cylinder pairs

For instance, the force acting on the sleeves in No. 2 pair of cylinders may be represented by a force equal to three-fourths its value acting on No. 1 pair of sleeves and a force one-fourth its value acting on No. 5 pair of sleeves. After we have thus transferred all forces to the two end planes, we can combine those in the same plane by the parallelogram of forces. This method is illustrated in Fig. 8 and leads to the result that the five rotating forces represented in Fig 7 are equivalent to the rotating couple shown in Fig. 9. Such a couple could be balanced by means of balancing weights at opposite ends of the engine rotating at one-half crankshaft speed and extending in opposite directions from the crankshaft. However, the relatively small importance of this rotating couple does not warrant the mechanical complication.

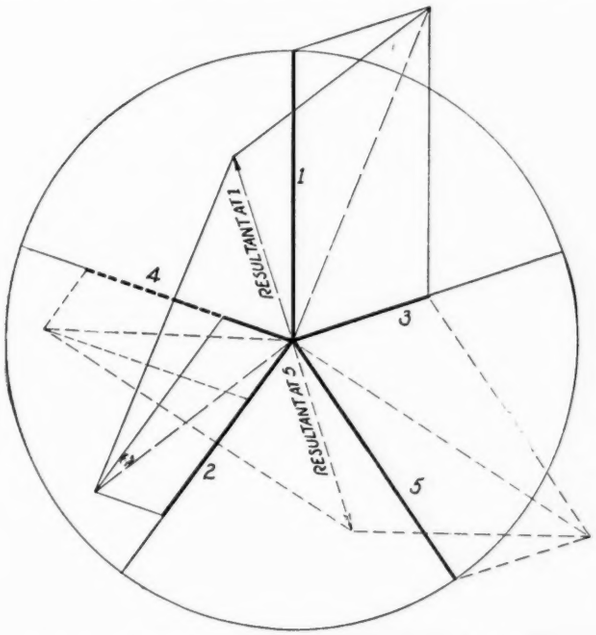


Fig. 8. Determination of couple equivalent to system of five radial forces spaced equally along crankshaft axis

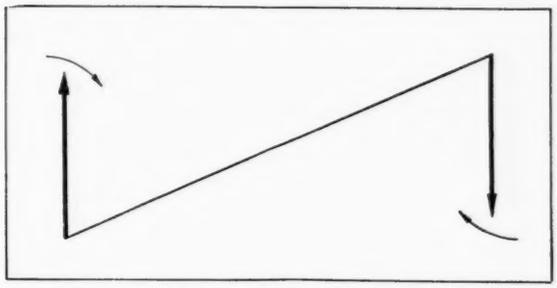


Fig. 9. Rotating couple due to primary inertia force on valve sleeves

The secondary unbalanced forces on the sleeves are similar to those on the pistons and associated parts. The instantaneous forces on the sleeves in the two cylinders of one pair are directly opposite in phase, and since they act along lines at 45 deg. to the horizontal, their resultant will at all times be in a horizontal plane. The resultant of the forces on all five pairs of sleeves will be a horizontal rocking couple of half the frequency as that due to the crank trains. The magnitude of this rocking couple, however, will be so small that it is not worth while discussing it in detail.

It will thus be seen that in a 10-cylinder 90 deg. sleeve valve engine, only the primary inertia forces on the crank train parts can be readily balanced; there is a horizontal rocking couple due to the secondary inertia forces on the crank train parts, a rotating couple due to the primary forces on the valve sleeves and a horizontal rocking couple due to the secondary forces on the valve sleeves. Therefore, from the standpoint of balance of reciprocating parts, the 10-cylinder 90 deg. construction is of about the same order of merit as the ordinary eight-cylinder 90 deg. V type with single plane crankshaft.

Automotive Products Again Second in U. S. Export Trade

AUTOMOTIVE products continued to hold their position during 1926 in the foreign trade of the United States, with automobiles, parts and accessories occupying second place in the export list with 6.8 per cent of the total; gasoline, naphtha, etc., occupied third place with 5.6 per cent of the total. Crude rubber, including latex, ranked first in the list of imports with 11.4 per cent of the total.

According to "Our World Trade in 1926," recently published by the Foreign Commerce Department, Chamber of Commerce of the United States, this country's foreign trade during 1926 amounted to $9,239,000,000, the largest in history with the exception of 1919 and 1920 which, from this standpoint particularly, were abnormal. Of this total, exports accounted for $4,808,000,000 or 52 per cent while imports totaled $4,431,000,000 or 48 per cent. The excess of exports over imports amounted to $377,575,000 in 1926, as compared with $683,258,000 in 1925.

The imports during 1926 increased in value over those of 1925 by $204,000,000, while exports decreased in value about $101,000,000. In spite of this decrease the 1926 exports were greater than in any year since 1920 and were more than double the value of pre-war exports prior to 1913.

In the exports of both gasoline and of automobiles new records were made during 1926 both in quantity and value. Exports of automobiles were valued at $320,166,000 or 0.6 per cent more than those of 1925, and were only exceeded by exports of unmanufactured cotton.

Europe was our best customer during 1926 with United Kingdom, Germany and France, together with Canada and Japan, making up the first five leading markets. These five countries alone took over half (54 per cent) of our exports. Markets making noteworthy gains in numerical rank from 1925 included Australia, Netherlands, China, Philippines, British South Africa, Colombia, Chile, British India, Venezuela, Peru, Dutch East Indies, Finland, British Malaya, Guatemala, Portugal, Egypt, Irish Free State, and Algeria and Tunis.

Prices of our imported goods during 1926 were, on the average, some 2 per cent lower than in 1925, yet total value of imports was more than in any year since 1920 when inflated prices of cane sugar carried it to more than 5¼ million dollars.

Sounder Retail Financing Discussed by Truck Builders

Resolution calling for less liberal time sales terms is submitted to Motor Truck Industries, Inc. Recites that loose terms and credits have been dangerous and costly.

BANKERS and finance houses look with disfavor upon many of the practices now prevalent in the motor truck industry. Fortunately, conditions are improving and will improve more rapidly with the determination of the manufacturing and distributing industries to stop the uneconomic practices which have hampered their progress in recent years.

Loose terms and credits have done the industry considerable harm and only a complete revision of business standards as regards these and kindred matters will reinstate the motor truck industry in the eyes of the financial world.

This was the gist of the speeches made in Chicago before the meeting of Motor Truck Industries, Inc., of America, last week, when the Sales and Finance Committee submitted to the members a resolution regarding retail financing terms which was very much in line with the platform of the newly formed Motor Truck Association of Illinois. The resolution, which appears on the opposite page, was preceded by a preamble expressing the following ideas:

Loose terms and credits have been actually dangerous financially and extremely costly to:

1. The truck maker, because they have:
   a. Absorbed an undue proportion of his working capital.
   b. Restricted his borrowing capacity for other merchandising activities.
   c. Multiplied his contingent liabilities beyond a point of safety.
   d. Absorbed his profits on good sales to meet his losses on bad ones.
   e. Set up an unreasonable cost of doing business in the disposing of repossessed trucks.
   f. Educated the buying public to expect and bargain for unreasonable terms.
   g. Made it easy for dishonest and irresponsible buyers of trucks to follow practices discreditable to the trade.
   h. Encouraged a system of reprisals on the part of competing companies and so promoted a spirit of bitterness which has served to exaggerate the very offenses against which such reprisals were directed.
2. The parts makers and other sources of supply for materials, because they have:
   a. Rendered the control of merchandising credits extended by them to truck makers extremely onerous to watch because of the oft times rapid shifting of truck makers' available working capital to frozen or slow moving "Customers' Paper."
   b. Occasioned them disproportionate losses through the failure of truck makers who have intemperately indulged in the general practice of loose terms and credits.
3. Buyers of truck paper (including bankers, brokers, and finance companies), because they have:
   a. Increased the cost of handling the paper through the failure of makers to adhere to terms.
   b. Occasioned excessive ultimate losses through the failure of both makers and indorsers to pay.
4. Owners and operators of trucks, because they have:
   a. Been dissatisfied with liberal terms and credits when, as was generally the case, they could easily learn of more liberal terms granted with less reason.
   b. Set up irresponsible hauling competition serving to lower rates below an honest cost of doing business.

The directors of the Illinois association were present as guests, and their president, S. M. Williams, enlarged on the resolution, pointing out some of the many defects and difficulties to be overcome by the trade at the present juncture.

He voiced the opinion that many of the present-day troubles of the truck industry are due to the anxiety of the manufacturers and distributors to place trucks in the hands of users without caring who those users are. Too little consideration, he said, has been given to the buyer's integrity or capability. The result has been that unfair competition has been created for the legitimate operator. These latter in turn have endeavored to bear uneconomic competition by overloading, which has resulted in the swallowing up of the extra revenue by high operating costs. Repossessions result from both the good and the bad operators as a consequence. These practices have continued because the truck industry has not realized sufficiently that its success depends upon the success of the operators of its trucks.

Trading-in practices, Mr. Williams stated, have resulted in converting truck salesmen into mere used-truck buyers. They have now reached a stage where they are afraid to turn down business of any kind, and one retailer dares not refer to a competitor for information as to a buyer's standing for fear of passing on a prospect. Each dealer and distributor has grown suspicious

of the others, but as far as Chicago is concerned that period of distrust is now largely past.

The new truck association has brought dealers together, Mr. Williams said, and the resultant acquaintanceship has helped wipe away the distrust and prejudice so that they can cooperate in building for the future.

C. H. Fox, vice-president of the Chicago Trust Company, explained why bankers do not like truck paper. First he reminded his hearers of some of the cardinal principles of banking which are so often overlooked by the individuals composing the truck industry.

A few years ago, he said, when truck paper first appeared, the banks preferred it to private automobile paper, on the theory that the truck was of commercial value where the "pleasure" car was a luxury, and that the buyer would relinquish a luxury in preference to his means of livelihood.

This proved a fallacy, however, as it appeared to be considered no disgrace to lose a truck, whereas family pride made the buyer hold on to his family car.

One of the first principles of banking is that the money the banks lend belongs to their depositors, Mr. Fox pointed out, and therefore no risks can be taken. All loans should be of such a character that they are repayable even if the business of the borrower fails; it should not depend on the profits of the business. Such loans as do depend on profits are no more than stock investments.

Much thought on instalment payment business has evolved the principle that all financing of the instalment plan sales must be based, in the final analysis, on the resale value of the commodity, Mr. Fox said. Therefore unless it is possible to sell the commodity at any time for the balance unpaid, the loan is unsound. Banks buy paper and not trucks.

One inherent fault of the truck industry, in Mr. Fox's opinion, is that its merchandise is not sufficiently standardized. Such things as expensive bodies for special purposes limit the resale possibilities.

Standardization of parts has been a move in the right direction, he thinks, because it has minimized the sales resistance on obsolete models or orphans. Another factor is the existence of a number of weak manufacturers, some of whom might quit and so affect the value of their products.

That the used truck is an effect and not a cause was pointed out by C. C. Hanch, general manager of the National Association of Finance Companies.

Some interesting statistics were injected into his talk by Mr. Hanch. In 1919, he stated, for every 100 new cars sold there were 99 traded. In 1925 there were only 90 per cent traded. While no actual figures were available for the truck business, he estimated the proportion of trades to new vehicles to be around 80 to 90 per cent.

He pointed out that if trucks are sold on six equal monthly instalments the amount outstanding becomes stabilized at 39 per cent of the annual turnover. On 12 monthly instalments the amount outstanding is 54 per cent and on 24 instalments no less than 104 per cent of the annual turnover.

He illustrated the effect of low down-payments on repossessions by the example of passenger cars. With one-third down the repossessions totaled 1¾ per cent. With a 25 per cent down-payment the repossessions were 3 8/10 per cent. With smaller down-payments than 25 per cent the repossessions jumped to nearly 11 per cent. These figures were based on reports of 150 finance companies.

On used cars with a 40 per cent down-payment the repossessions were 4½ per cent while a payment of 37 per cent jumped the repossessions up to 8½ per cent. On time sales over 12 months the average loss per car was $65 and for longer terms $94.

Concluding, Mr. Hanch stated that National Association of Finance Companies is ready to tackle the question of commercial vehicle financing and already has a committee appointed for that purpose. It is expected that standard terms will be recommended before the end of November this year. He pointed out that there is bound to be some considerable difference between the recommendations for commercial vehicles and those which have been in force for passenger cars.

He also promised to recommend to the N. A. F. C. committee that it maintain a close contact with the Motor Truck Industries, Inc., committee so that the two may work together.

Resolution on Time Sales Submitted to Motor Truck Industries, Inc.

FOLLOWING is the resolution pertaining to time sales submitted to the members of Motor Truck Industries, Inc., at the Chicago meeting:

"1. All merchandisers of trucks should give more careful consideration to the terms and credits granted in the sale of trucks.

"2. Terms and credits are inseparable in their consideration. Suitable terms to a person or concern of high grade credit are entirely unsuitable to a person or concern whose credit is dubious.

"3. That, as a rule, payment of not less than 25 per cent of the selling price should be exacted. Such selling price should include:

a. Invoice price of chassis
b. Body when sold with chassis
c. Equipment
d. Taxes, except license fees
e. Finance charges
f. Freight
g. Insurance

"4. Where a used vehicle is accepted in part payment the amount of the allowance for such vehicle should be deducted and not less than 25 per cent of the remaining amount should be required to be paid in cash.

"5. That deferred payments should extend over a period not to exceed 18 months.

"6. In no case should sales be made where all the circumstances do not give promise that any paper taken will 'pay out' without recourse to the repossession of the truck.

"7. In every sale involving deferred payments the best credit information obtainable respecting makers of notes and indorsers should be exacted.

"8. That this expression shall be given the greatest possible publicity."

Hydrogen Mixed With Air Improves Oil Engine Operation

Use as auxiliary fuel for aircraft purposes contributes to sweeter engine performance, according to tests made in England. Coal gas also gives good results.

IN connection with the investigation of the practicability of the oil engine for the propulsion of aircraft which has been made for the British Air Service, some experiments have been made in regard to the effect of admitting small quantities of hydrogen and of coal gas with the air, and also on the effect of reduced air intake pressure on the performance of an oil engine.

In an airship flight, as the supply of oil fuel is consumed, a corresponding amount of hydrogen must be released, and it thus becomes of importance to determine whether this waste hydrogen may be utilized to replace a portion of the oil fuel supplied to the engine. The proportion of fuel gas admitted with the air must, of course, be kept sufficiently low so that no explosion can take place when the mixture is compressed.

A paper on these tests was presented before the Institution of Automobile Engineers and the Royal Aeronautical Society by G. F. Mucklow, M. Sc. The engine used in the tests was a Crossley single-cylinder, solid-injection, heavy-oil engine of 14 in. bore and 23 in. stroke, having a volumetric compression ratio of 10.3 to 1 and being rated at 66 hp. at 211 r.p.m.

No ill effects of any kind ensued from the use of gas, nor were any indications of pre-ignition or detonation experienced, and it was found that when any appreciable quantity of either coal gas or hydrogen was being admitted, the engine appeared to run more sweetly. The following conclusions are drawn from the results:

Small quantities of hydrogen or coal gas can be employed as an auxiliary fuel in a solid-injection oil engine. When gas is being admitted the engine appears to run more sweetly than when the same power is being developed with oil alone. No ill effects are produced by the use of gas beyond a slight reduction in the thermal efficiency and a slightly hotter exhaust.

Reduction in Brake Thermal Efficiency

With an amount of hydrogen equal to 3 per cent by volume of the air supply to the engine, the reduction in brake thermal efficiency at the highest load dealt with (53.4 b.hp.) is 5.3 per cent of the normal efficiency, while the corresponding reduction at the lightest load (24.4 b.hp.) is 10.9 per cent of the normal efficiency appropriate to this load.

There are indications that as the amount of hydrogen admitted is increased, the thermal efficiency approaches a minimum value, after which it is suggested that the efficiency would again rise as the proportion of hydrogen to air became such as to ignite spontaneously at the compression temperature and pressure.

In the case of coal gas, over the range tested, the thermal efficiency falls in direct proportion to the percentage by volume of coal gas admitted, the fall being greater at light loads. Thus for each 1 per cent increase in the ratio coal-gas/air by volume the fall in efficiency at the highest load (54 b.hp.) is 0.52 per cent of the normal efficiency, while at the lightest load dealt with (24.5 b.hp.) the fall in efficiency is 4.0 per cent of the corresponding normal efficiency.

The admission of small quantities of either coal gas or hydrogen gives rise to a slight increase in the amount of heat rejected to exhaust, accompanied by a corresponding increase in the temperature of the exhaust gases. The rate of increase of exhaust gas temperature with increase in the amount of gas admitted is approximately the same at all loads, and is unaffected whether coal gas or hydrogen is in use. Thus each 1 per cent increase in the ratio by volume of gas/air causes a rise of approximately 10 degrees Fahr. in the temperature of the exhaust gas.

Slows Down Combustion

It appears that the admission of such small quantities of hydrogen or coal gas as were employed in the present investigation leads to a slowing down of the rate of combustion accompanied by a reduced maximum pressure. With amounts of hydrogen up to 3 per cent, and coal gas up to 5 per cent by volume of the air consumption of the engine, there is no noticeable pre-burning during the compression stroke, and the point in the stroke at which combustion starts is controlled by the oil fuel injection. The rapidity of the pressure-rise following the initiation of combustion appears, however, to be reduced by the admission of gas, coal gas producing a greater effect in this direction, volume for volume, than hydrogen. There are also indications that, as the proportion of hydrogen to air is increased beyond a certain point, the slowing-down effect on combustion ceases.

Over the range covered by the experiments, it appears that the rate of decrease in maximum pressure with increase in the amount of hydrogen admitted is the same for all loads, and that each 1 per cent increase in the ratio hydrogen air by volume causes the maximum pressure to be reduced by 4.3 lb. per sq. in.

In the case of coal gas the rate of decrease in maximum pressure appears to be greater at reduced loads. At the highest load dealt with (54 b.hp.) each increase of 1 per cent in the gas/air ratio causes a reduction of 4 lb. per sq. in. in the maximum pressure, while at 24.5 b.hp. the corresponding reduction is 8 lb. per sq. in.

The tests at reduced intake pressure were made to simulate conditions in altitude flying and the following conclusions were drawn from them:

(1) *Brake Thermal Efficiency.*—When running at constant load and with constant speed, the brake thermal efficiency of the engine falls as the suction pressure

is reduced, the rate of fall being at first comparatively slow. As the suction pressure is reduced a point is reached after which a further reduction in suction pressure leads to a much more rapid fall in efficiency, this point occurring earlier as the load on the engine is increased.

It appears that when the air-fuel ratio by weight is reduced, either by throttling the air intake or by increasing the load, to a value in the neighborhood of 30, the rate of fall of brake thermal efficiency with reduction of suction pressure becomes more rapid. It appears, moreover, that the rate of fall in efficiency, both before and after this value is reached, is approximately independent of the load on the engine.

At the highest load considered (68.1 b.hp.), a reduction of 2 lb. per sq. in. in the suction pressure results in the brake thermal efficiency being reduced by some 17 per cent of the thermal efficiency under normal conditions. At the lightest load (24.1 b.hp.) the corresponding reduction in efficiency is 4.4 per cent of the normal thermal efficiency appropriate to this load.

(2) *Fuel Consumption.*—At all loads the fuel consumption per brake horsepower increases as the suction pressure is diminished. With air/fuel ratios above approximately 30, the rate of increase in fuel consumption with reduction of suction pressure is slow, but this rate shows considerable increase if the air/fuel ratio is reduced below 30. Thus when delivering 68.1 b.hp., a reduction of 2 lb. per sq. in. in suction pressure causes the fuel consumption per brake horsepower per hour to increase by 20.7 per cent of that under normal conditions. At the lightest load dealt with (24.1 b.hp.) the corresponding increase would be 1.7 per cent of the normal consumption at this load.

(3) *Heat-Losses to Jackets and Exhaust.*—Of the total of the heat lost to the cylinder barrel and breech, the proportion lost to the barrel decreases in direct proportion to the reduction in suction pressure, the rate of decrease being somewhat greater at heavy than at light loads. The proportion lost to the breech shows a corresponding increase as the suction pressure is reduced.

The amount of heat lost to the exhaust increases in direct proportion to the reduction of suction pressure, the rate of increase being greater at heavy than at light loads.

Expressed as a percentage of the heat supplied in the fuel, the heat-loss to exhaust at first increases slightly with reduction of suction pressure, but at all loads a point is soon reached after which a further reduction of suction pressure causes the percentage loss to exhaust to decrease.

(4) *Exhaust Gas Composition and Temperature.*—No carbon-monoxide or unburnt hydrocarbons appear to be formed under the conditions covered. When tne suction pressure is greatly reduced, and especially at heavy loads, the exhaust gases become cloudy and dirty, and it appears that some of the fuel injected is evacuated unburnt in the exhaust.

Exhaust Gas Temperature

The temperature of the exhaust gas increases with reduction of suction pressure, the rate of increase being greater at heavy loads. Thus a reduction of 2 lb. per sq. in. in suction pressure causes a rise of 255 degrees Fahr. in the exhaust temperature at 68.1 b.hp. At 24.1 b.hp. the corresponding increase in temperature is in the neighborhood of 70 degrees Fahr.

(5) *Combustion and Expansion.*—As the suction pressure is reduced, there is a longer delay between injection and the point in the stroke at which occurs the rapid rise in pressure denoting the start of combustion. For the same reduction in suction pressure this effect is greater at heavy than at light loads. Thus at 68.1 b.hp. the amount by which the "point of rapid pressure-rise" is retarded for each 1 lb. p. sq. in. decrease in suction pressure is 1.5 deg. crank angle, while at 24.1 b.hp. the amount would be 0.9 deg.

The rate of pressure rise after combustion has started appears to be unaltered by a reduction of suction pressure.

The indicated maximum pressure is reduced in proportion to the reduction of suction pressure, the rate of decrease, while constant for any one load, becoming greater as the load on the engine is increased.

The fall of pressure during expansion takes place at a slower rate as the suction pressure is reduced, and it appears that the amount of heat evolved by combustion during the expansion stroke is increased by a reduction in suction pressure.

£450,000 Cut From British Aircraft Budget

GREAT BRITAIN from now on will order no more airplanes and aircraft engines of wartime design. This was brought out in a speech made in Parliament recently by Sir Samuel Hoare, when he presented the air estimates. In the past such equipment has been purchased for reasons of economy, but in view of the importance of keeping air equipment strictly up-to-date, the new policy has been decided upon.

Total expenditures of £15,550,000 are provided for in the new estimate, which is less by £450,000 than the amount spent last year. For technical and warlike stores a sum of £8,789,000 is set aside. This covers the experimental and research services, as well as airships. The vote includes £5,904,000 for machines, engines and spares, which is higher by £553,000 than the amount spent for these items last year. Provision is made in the estimates for two new regular squadrons and one non-regular squadron for home defense, as well as for five new flights for the Fleet Air Arm and one for Army cooperation purposes. On research it is planned to expend a total of £355,000, or £19,000 more than was spent under the 1926 budget.

It was brought out that the two 5,000,000 cu. ft. airships now under construction, one by a private firm and the other at the Government plant at Cardington, will make it possible to carry a complete squadron of airplanes and the necessary personnel to any threatened part of the Empire in much less time than by the ordinary means of transport. For airship development £452,000 is set aside in the estimate, of which £90,000 is for instalment payments to the firm building one of the ships.

A sum of £464,000 is voted for civil aviation, including subsidies to the amount of £247,000, nearly the whole of which will be paid to British Airways, Ltd. The remainder of the civil aviation fund will be expended for airdromes (landing fields) air routes, technical equipment, works, buildings, lands, etc. For the air service between Cairo and Basra £93,600 is allotted.

Fawick Designs Transmissions With Two Quiet Driving Ranges

Has three separate models, one with four speeds, one with six and another with two. Six-speed model incorporates a conventional three-speed-forward-and-reverse transmission.

THOMAS L. FAWICK, of Racine, Wis., who some years ago achieved considerable success with a twin-disk clutch designed primarily for tractor service, has been working recently on transmissions for passenger cars and trucks, characterized by two quiet driving ranges. The one quiet driving range is obtained through the medium of a "direct-through" drive with all gears idling, while the second is obtained through internal gears and pinions.

In a four-speed gear designed by Mr. Fawick, and which is illustrated in Fig. 1, the double reduction by internal gears is incorporated with the clutch shaft. This shaft *A* is made tubular and has a short rod *B* inserted in it which serves as a connecting link between the shifter collar *C* and the clutch sliding member *D*. From the shifter collar *C* an arm connects to one of the slider bars *E* of the transmission. There are three of these slider bars, located in the upper part of the transmission housing.

In the drawing, the sliding clutch member is shown in the rearmost position, in which it places the part *F* —which comprises two spur pinions at its right hand end—in driving connection with the clutch shaft *A*. This part *F* is supported in a large ball bearing mounted in a partition wall in the transmission case, and it in turn supports the rear end of the clutch shaft through a Hyatt roller bearing. The rear end of the clutch shaft has a bushing inserted in it, which serves as a pilot bearing for the splined shaft *G*, on which are mounted the pinion *H* for the direct-drive and the second speed, and the pinion *I* for the low speed and reverse.

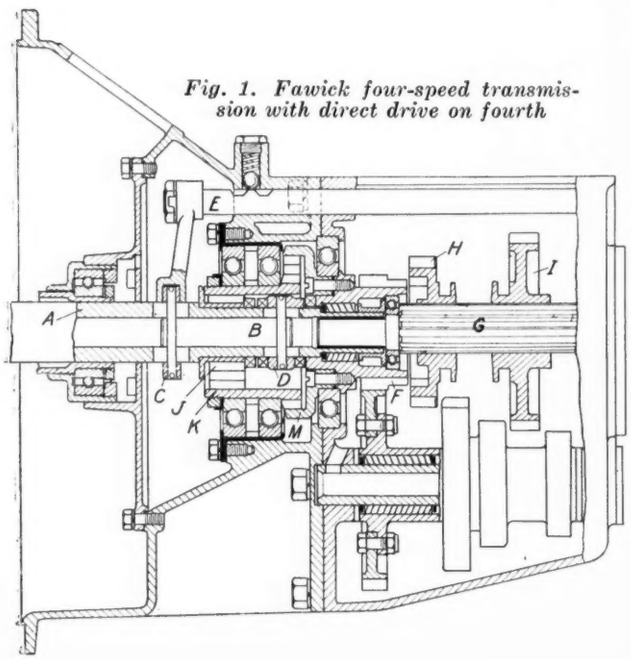


Fig. 1. Fawick four-speed transmission with direct drive on fourth

When the sliding clutch member *D* is shifted to the left it secures the spur pinion *J* to the clutch shaft. This meshes with the internal gear ring *K* forming an integral part with the spur pinion *L*, which latter meshes with the internal gear *M* bolted to part *F*. Thus part *F*, which carries the constant mesh pinion and the usual direct-drive clutch jaws, may be connected to the clutch shaft either directly or through the double internal gear reduction. When connected directly and the high speed clutch is in engagement, a "direct-through" drive is obtained, and the internal gears then run idly. On the other hand, when pinion *J* is clutched to the clutch shaft, the power is transmitted through the two internal sets and member *F* to the splined shaft. This is the third forward speed.

Rear Part is Conventional

The rear part of this four-speed transmission is similar in every respect to an ordinary three-speed transmission, the sliding pinions *H* and *I* being controlled each by a separate sliding bar in the top of the transmission housing. Attention may be called to the rigid support of the various shafts and gears. Thus the double internal member *K-L* is supported in two large ball bearings mounted in the housing. The clutch shaft is supported in a ball bearing in the forward wall of the housing and in a Hyatt roller bearing located inside the part *F*, which in turn is supported in a large ball bearing in a partition of the housing.

That portion of the clutch shaft on which the Hyatt rollers bear is reduced in diameter, and the part immediately to the left is splined, to take the internally splined clutch sliding member. End thrust on the splined shaft is taken up on an annular ball bearing.

Another design has been worked out in which the first pinion of the double internal assembly is arranged to slide on a splined shaft and to serve also as a direct-drive clutch, rendering the internal gears idle when engaged. This considerably simplifies the construction, but the combined internal and spur gear is supported only in a single roller bearing, which is probably not so satisfactory.

A transmission giving six forward and two reverse speeds is shown in Fig. 2. In this the internal gear is located at the rear of a regular three-speed-forward-and-reverse transmission. Only a single internal gear and pinion assembly is used and the gears are moved into mesh by a rocking motion of the control lever.

The forward part of the transmission is identical

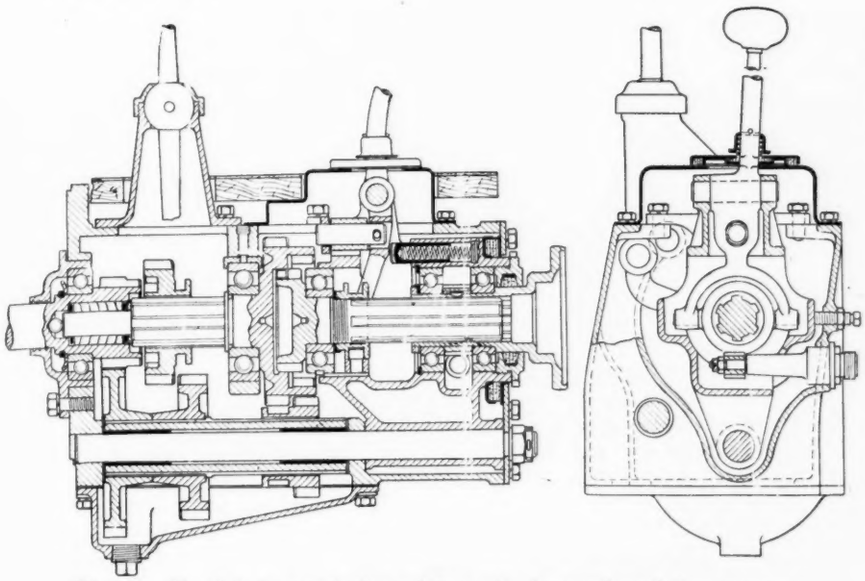


Fig. 2. Fawick transmission giving six forward and two reverse speeds, with over-drive through internal gears

with the usual three-speed transmission, except that the splined shaft is supported in a ball bearing located ahead of the low speed gear, instead of behind it, and that the low speed pinion slides while the corresponding gear is fixed to its shaft. Combined with this low speed gear is an internal gear on the rear side of it. In reality there are two internal gears, located side by side, but the inner one serves as a clutch member only. Within this member there is a spur pinion, of such size that it will exactly enter the inner one of the two internal gears, to clutch the forward splined shaft carrying the intermediate and low speed gears, to the splined shaft carrying the spur pinion. This latter splined shaft is located

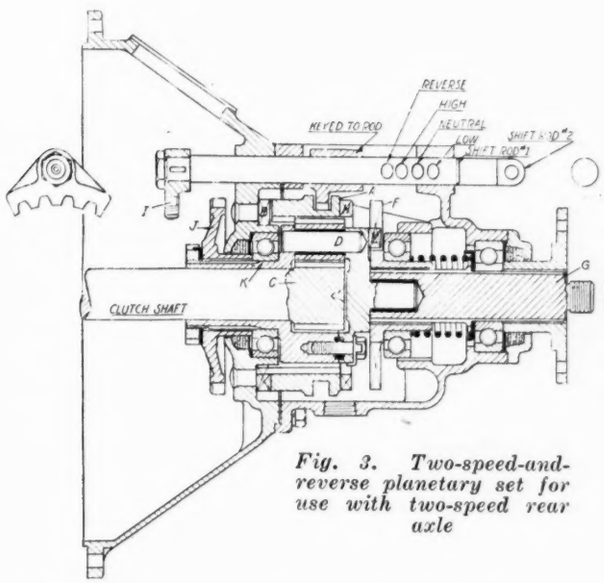
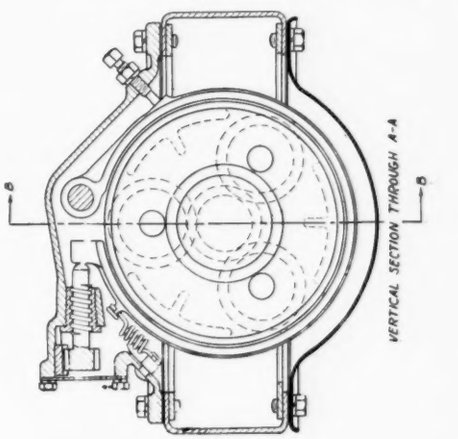


Fig. 3. Two-speed-and-reverse planetary set for use with two-speed rear axle

inside a hollow, internally splined tail shaft and is capable of being slid lengthwise in it, thereby either bringing the spur pinion into engagement with the internally toothed clutch member or opposite the internal gear for the over-drive.

The assembly of the two concentric splined shafts at the rear end of the transmission is supported in a rocking bracket pivoting around an extension of the secondary shaft. This part of the transmission is controlled by a separate lever of the cane type. When it is rocked into such a position that the rear shafts are concentric with the forward shaft, the intermediate splined shaft with its spur pinion may be slid forward by means of the cane lever and the rear and front shafts clutched together for a "direct-through" drive. It will be noticed that the forward ball bearing supporting the spur pinion shaft slides with the shaft in its mounting, the outer race being prevented from rotating in the mounting by means of a key.

To secure the over-drive, the spur pinion is first withdrawn toward the rear and the whole rear assembly is then rocked to one side through an angle of 6 deg. 26



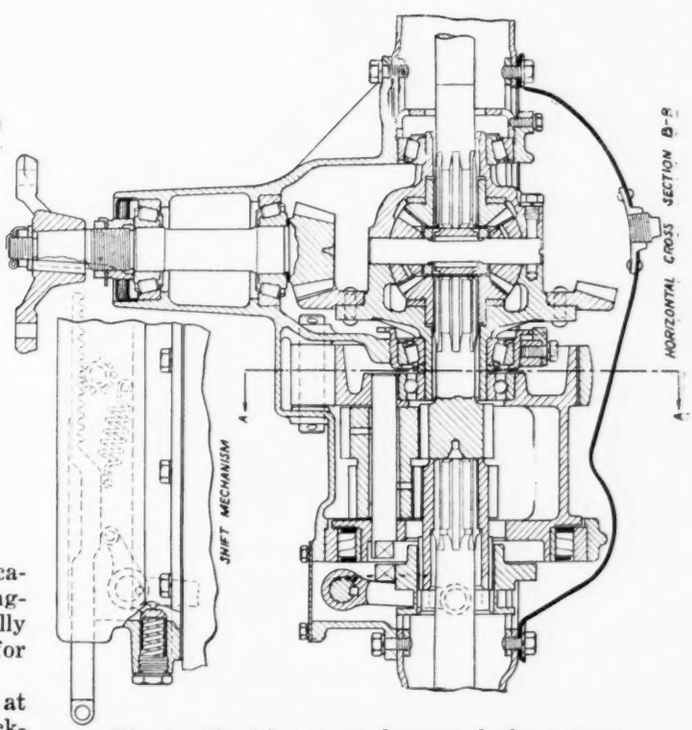


Fig. 4. Fawick two-speed rear axle for use on light trucks

min. to bring the spur pinion into engagement with the internal gear. To hold the bracket supporting the spur pinion in this position against the tooth reaction, it is provided with a latch bolt.

The whole of the rocking bracket is located inside an extension of the transmission housing, from which only the control handle and the bearing for the driven shaft extend, and oil-tight sliding joints are provided at these points, so that the over-drive and its bearings can be effectively lubricated.

Two-Speed Forward and Reverse

In Fig. 3 is shown a two-speed forward and reverse transmission which is intended for use with a two-speed axle, giving a four-speed-forward-and-two-reverse combination. It comprises a planetary set of the internal gear type having the peculiarity that either the spider carrying the planetaries or the internal gear can be made the driven member. In the drawing the parts are shown in the positions corresponding to the low speed forward. Internal gear *A* is held from rotating by means of key *B* secured in the stationary housing. Pinion *C* on the driving shaft causes planetaries *D* to roll on the inside of the stationary internal gear *A*, and through the clutch jaws *E* on the planetary spider the motion is transmitted from the latter to the spider *F* on the splined driven shaft *G*.

By shifting the internal gear to the right until it is free of key *B* the transmission is placed in neutral. By shifting it still farther to the right the clutch jaw *H* on it will engage with clutch jaw *F* on the splined driven shaft, and the whole assembly will then revolve as a unit, giving the direct drive or high speed. By moving the internal gear *A* still farther to the right it will cause the spider *F* to disengage from the clutch jaw *E* on the planetary spider. At the same time the toothed sector *I* engages with the gear wheel *J* which is secured to the splined hub of the left hand planetary spider *K*. In this way the planetary pinions are held stationary in space, and the internal gear *A* is revolved through them in the reverse direction from the driving pinion. This reverse motion is communicated through the clutch jaws *H* and *F* to the driven shaft *G*, thus giving the reverse speed.

The rear axle drive gear to be used with this transmission is illustrated in Fig. 4. The ordinary bevel drive gear and differential is used. One of the differential side gears connects to a rear axle shaft in the usual way, but the other connects to a short shaft which carries a spur pinion meshing with three planetary pinions. Each of these planetary pinions is formed integral with another meshing with a gear secured to the other axle shaft. The planetary spider is developed in the form of a drum which can be held from rotating by means of a band brake to give the under-drive or speed reduction, while the short shaft and the axle shaft adjacent to it can be locked together by means of a jaw clutch for the direct drive. While the under-drive is in operation there is evidently relative rotation of the two side gears of the differential and the differential gears are therefore turning under load and perform a function in the speed reduction. It is stated that this two-speed rear axle drive is satisfactory for truck service where a slightly noisy operation is not objectionable. It will be noticed that the two sun wheels of the planetary combination have no bearing close to them, they being held in alignment by the tooth reactions of the three equally spaced planetary pinions.

Books for the Business Bookshelf

Managing a Factory

Factory Management. Paul M. Atkins. Prentice-Hall, Inc., New York. 386 pp., Illus. $5.

AS the title indicates, this is another book which is intended to give student or actual factory managers a more or less practical tool with which they can carve out success in their chosen field. The contents cover practically everything in which a factory manager is interested, but in the space of 386 pages it is evident that little more than fundamental principles can be given over such a broad field and, if the truth must be known, these principles will be by no means new to most of the readers of this book. The work contains a large number of illustrations but, unfortunately, the result is of such a nature that the halftones, in particular, are little more than legible.

American Business

The Marketing Problem. Edward T. Melbourne. Longmans, Green & Co., Ltd., 39 Pasternoster Row, London, E. C., 4. 216 pp. $4.

MOST Americans, upon seeing all about them the evidences of an unparalleled prosperity, believe that, in general, all phases of business must be handled in a rather intelligent manner, but relatively few of them, we believe, appreciate fully the extent of our progress in management methods. This book, written by an English business man for the purpose of showing his British brothers how business is run in this country should prove very interesting to Americans.

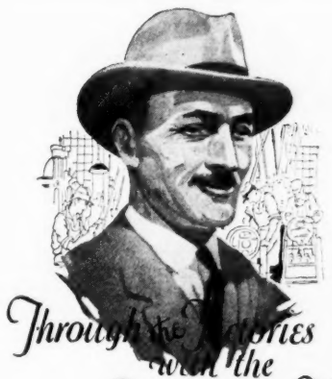
It contains about the only full account we have seen of the underlying aims and policies which have helped so much to make this country so prosperous. The chapter headings indicate the coverage—a few of them being: Commercial research; elimination of waste; trade association activities; budgetary control; the marketing counsel; advertising; distribution.

For Snappy Salesmen

Tips for Traveling Salesmen. Herbert N. Casson. B. C. Forbes Publishing Co., New York. 144 pp. $2.

TO those salesmanagers who pin their faith upon the use of high pressure, inspirational stuff for getting results from their salesmen this book will prove a godsend; others may find it, possibly, of slightly less value. The author reviews all the well-known and time-worn precepts for getting the prospect to "sign on the dotted line," but his method of presenting them is very dynamic, requiring the frequent use of short, snappy sentences and capital letters. For those who care for this type of presentation the book should be of interest; others may fail to find inspiration in it.

ON page 236, *Automotive Industries* of Feb. 19, the gasoline tax collected in Connecticut for the year of 1926 is given as $275,000. This is incorrect. The figure should have been $2,682,372.



Rivets Heated *in* Holes *to* Insure Rigidity *of* Electric Truck Chassis

Are inserted in position with tolerance limit of 0.003 in. between hole and cold rivet and then heated by the use of a heavy electric current.

THE Commercial Truck Co., manufacturer of special purpose electric trucks, has developed at its Philadelphia (Pa.) plant a novel method of riveting chassis frame members in which the rivets are inserted cold and heated while in this position.

In the usual construction of its trucks, the storage batteries, which weigh upwards of 2000 lb. or more, are suspended from the frame between the front and rear wheels. Because of this great suspended weight it is essential that the frame, at its joints at least, be as rigid as possible since the presence of only a little play in the joints would quickly develop into serious trouble because of inertia of the batteries.

The sub-frame upon which the batteries is suspended is braced with truss rods to prevent fore and aft motion and the main frame, constructed of channel steel, is provided with cross members, angle irons and gusset plates in order to obtain maximum rigidity with allowance, at the same time, for a certain amount of flexibility needed when going over rough roads, etc.

Ordinary Methods Unsatisfactory

Since all these members are secured together by riveting it is obvious that even a very litfle slack motion in each rivet might produce in the entire chassis enough movement to affect the life of the chassis seriously. The ordinary method of riveting was found to be unsatisfactory. When rivets were heated before they were inserted in rivet holes these holes, of course, had to be large enough to take care of the expansion of the rivet caused by the heating.

With this appreciable difference between the cold size of the rivet and the hole it was found to be very difficult to obtain, in production, absolutely tight rivets since, no matter how tightly the hot rivets were worked, when they cooled the consequent contraction often caused a certain amount of looseness. In addition to this, rivets, when heated in the usual manner, could not be kept free from scale and this factor was also influential in preventing an absolutely tight joint being made.

After considerable experimentation a method was developed which has resulted in absolutely tight rivets with some slight saving in time. Rivet holes are now drilled instead of being punched. This permits the use of tolerance limits of 0.003 in. between the hole and the cold rivets. The rivets are inserted in the holes cold and then a very heavy electrical current is passed through them which heats them to the proper temperature in a very few seconds.

The current is brought to the job through heavily insulated cables with large copper terminals. The rivet holder holds one terminal against the head of the inserted rivet while the riveter holds the other terminal against the other end of the rivet, thus producing a short circuit through the rivet and surrounding frame metal. As soon as the rivet is heated sufficiently the terminals are dropped and the rivet is set with an air hammer.

In this method a tight joint is assured. Since there is not more than 0.003 in. clearance between the hole and the cold rivet it is evident that when heated the latter will be tight in the hole even before working. The frame is heated at the same time as the rivet so that when the latter is worked the two blend into what is practically a single piece of metal. This is furthered by the fact that the rivet need be expanded by working not more than 0.003 in. in order to make a tight fit.

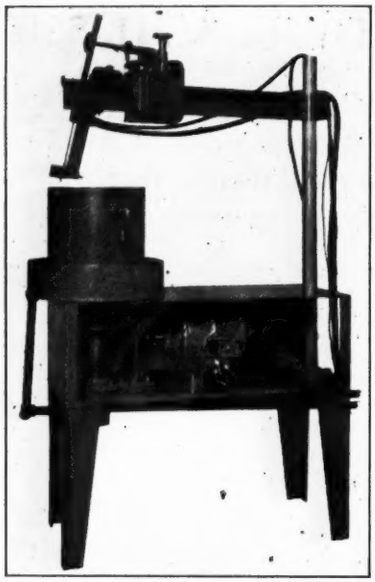
It is claimed that this method is considerably quicker than the ordinary method of riveting. If only two men are employed for the work when hot rivets are used, the time spent in inserting and withdrawing them from the fire is saved, since a supply of cold rivets can be maintained right at the work. The time required to heat the rivets electrically is surprisingly short so that with proper location of material and tools the work proceeds as quickly as if a third man were employed to supply hot rivets.

ACCORDING to statistics published by the periodical *Automobile-Revue*, based upon returns from the cantonal registration offices, there were 72,214 motor vehicles in service in the whole of Switzerland at the end of November, 1926. Of this number, 38,049 were passenger cars, 7870 motor trucks and 26,295 motorcycles. During the past year the number of motor vehicles in Switzerland increased by 12,982 or 20 per cent. The greatest number of motor vehicles is to be found in the canton of Zurich, which was 12,157. On the basis of vehicles owned in proportion to population Geneva is in the lead, that canton having one motor vehicle to every 21.2 head of the population.

NEW DEVELOPMENTS—Automotive

Water-Cooled Arc Welder

THE Lincoln Electric Co., Cleveland, Ohio, has developed an automatic carbon arc welding machine which is fitted with water cooling devices so that most any degree of heat may be maintained when working on metals where high welding temperatures would be destructive.

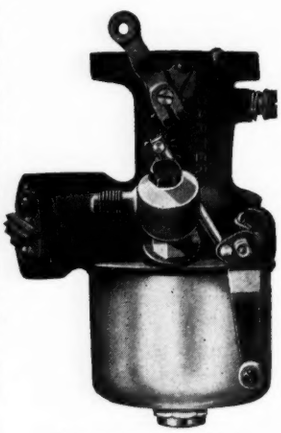


Lincoln Electric automatic carbon arc welder with water-cooled work table

The revolving work-carrying table which permits welding of circular seams up to 12 in. diameter is surrounded by cooling tubes. These can be filled with water so that the piece can be partially or totally submerged during the welding process. This feature is of particular value in welding high-grade alloy steels on which heat disturbance due to welding heat must be kept to a minimum. The frame and other parts of the machine are welded steel construction.

New Carter Carburetor

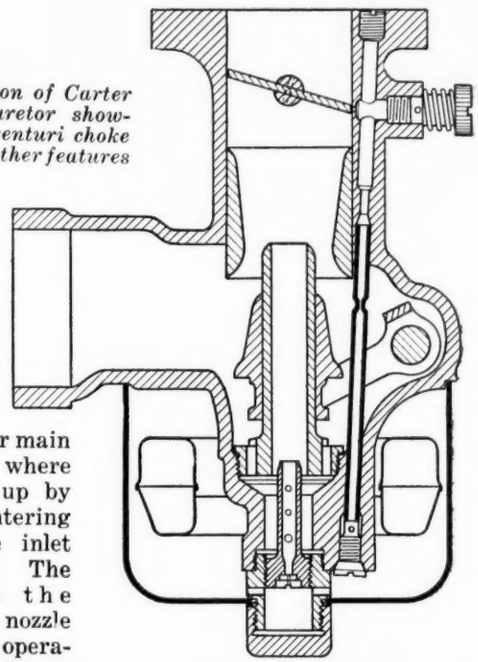
THE latest model of the Carter Carburetor Corp., St. Louis, Mo., is known as Model DRHO and is standard equipment on the 1927 Nash Light Six. It is illustrated herewith. Like all recent Carter models, it is of the multi-jet, plain tube type, with separate adjustments for low and high speeds. Its chief feature resides in the choking device, consisting of a cone-shaped element sliding up and down the standpipe. This shuts off the carburetor throat and forces all air entering the cylinders to pass through the carburetor well, which insures a very rich mixture for starting. The operation of the carburetor is as follows:



Carter Model DRHO carburetor

The low speed jet assembly supplies fuel for idling and for car speeds up to 15 m.p.h., the fuel flowing through the drilled passage connecting the low speed jet chamber with the carburetor well. When the engine is idling, gasoline is drawn through the low speed jet and the idling port at the edge of the throttle valve. The amount of air entering this port is regulated by means of the idling adjustment screw. When this is unscrewed or backed out, more air is admitted and the idling mixture is leaned.

The vertical jet in the base of the multi-jet nozzle delivers fuel direct to the nozzle chamber. Gasoline flow from the float chamber to the carburetor well is controlled by the high speed adjusting needle valve. A mixture of air and fuel enters the nozzle chamber from the accelerating well through accelerating jets in the sides of the nozzle. In the nozzle chamber this mixture mixes further with the fuel from the vertical jet. A fine spray is formed, which is carried by the standpipe to the venturi or main air passage, where it is taken up by the air entering through the inlet at the side. The openings in the side of the nozzle come into operation in accordance with the throttle position; the more the throttle is opened the more openings will be operating.



Section of Carter carburetor showing venturi choke and other features

It is claimed for this carburetor that its design makes over-choking impossible. In warming up the engine the choke is set in the position for which the engine runs best, and when the engine approaches the normal operating temperature it is fully opened. While the engine is idling, if the choke is partly closed, the engine speed is automatically increased. This tends to prevent stalling in traffic due to a cold engine. The choke is operated by means of a knob on the instrument board.

Model B Unishear

THE machine illustrated is the Model B Unishear recently developed by The Unishear Co., New York. It consists of a sturdy frame, provided with a large throat to accommodate wide sheets, which carries in its upper forward part the stationary blade and in its lower part the head unit containing an oscillating rocker with its blade and driving mechanism. Both the upper and

Parts, Accessories and Production Tools

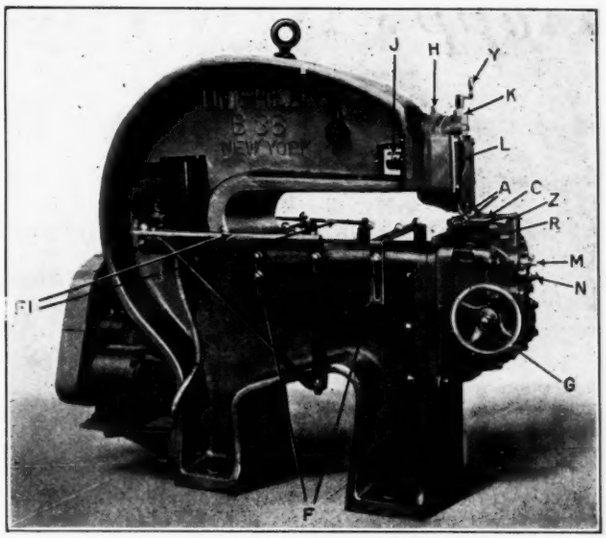
lower head units are self-contained and securely bolted to the frame.

The drive shaft is supported at the rear in a self-aligning, ball bearing pillow block. The pulley for belt drive or the Texrope sheave for motor drive is keyed to the rear end of the motor shaft. The motor is mounted on a bracket secured to the frame.

All revolving shafts of the shear head are mounted on taper roller bearings and all moving parts are lubricated with oil in a reservoir in the lower shear head unit.

To support heavy sheets, ball bearing casters are mounted on swinging arms on both sides of the frame and when shearing takes place the sheet is supported by the table and two rollers. Cuts can be started at any point within the sheet.

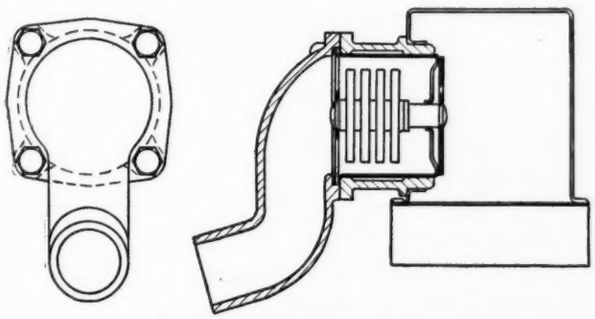
In the accompanying illustration *A* are sheet supporting rollers; *C* is the sheet steadying attachment; *F* and *F1* are the swinging supporting arms and brackets; *G* is the blade opening handwheel; *Y* is the operating handle; *J* is the clearance adjusting lock nut. Other letters indicate various adjusting pins and locknuts.



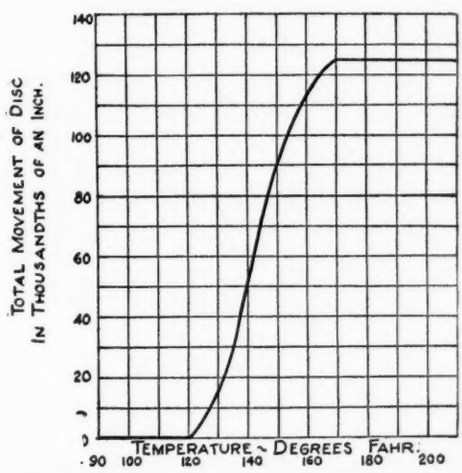
Model B Unishear

Thermostat for Cooling Systems

THE accompanying drawing shows one method of installation of the circulation control thermostat for water cooling systems on automobiles worked out by the Dunhameter Corp. of Chicago, Ill. The operating member is the same as the standard vapor thermostat which has been used by the C. A. Dunham Co. for a quarter century, the Dunhameter Corp. being the automotive branch of the aforementioned company. As will be seen from the drawings, the thermostat directly controls a poppet valve in the water line to the top tank of the radiator and opens into the tank. The entire unit consists of only three parts and this simplicity is said to account for a low price and freedom from troubles. The curve sheet reproduced herewith shows the movement of the valve in accordance with the temperature of the water.



Dunham water line thermostat



Temperature-movement curve for water thermostat

New Welding Electrode

A TYPE of welding electrode which combines the characteristics of a fluxed electrode and the quality of bead finish and the cleanness in handling of a bare welding electrode has been introduced by the Merchandise Department of the General Electric Co., at Bridgeport, Conn. Recommended for the general welding of steel, the electrode has a uniform flowing quality. Absence of sputtering or spattering, characteristic of the usual commercial bare welding wire, is one of the features of the new material. Elimination of the erratic arc condition leads to a deposit of more material with the same consumption of electrode per kw. hr. The electrode penetrates quickly and produces high tensile strength and unusual ductility and elongation.

Belt Sander Attachment

SO that both roughing and finishing work can be done at one time without the necessity of stopping operations to change belts, the Porter-Cable Machine Co., Syracuse, N. Y., has provided an attachment for its Type B-3 belt sander whereby two belts, each having a maximum width of 4½ in. can be employed.

The attachment consists of an aluminum idler pulley held against the right-hand belt by a spring which automatically secures the proper tension. The lower drive pulley is straight while the upper one is double-crowned for each belt.

Hupp's New Physical *Test Laboratory* Ready to Function

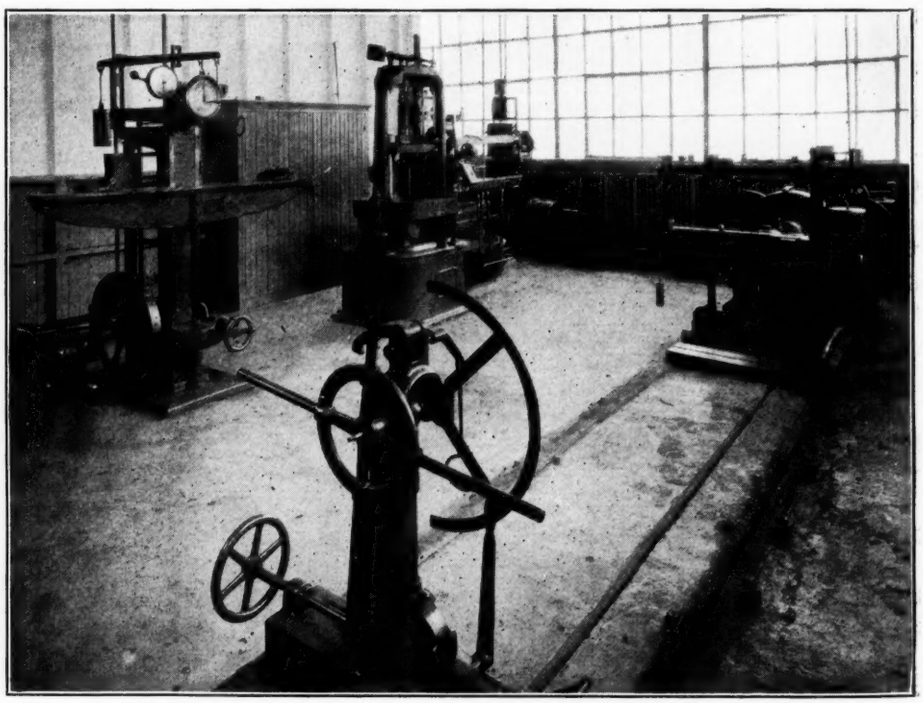
Equipment designed to handle practically all parts used in Hupmobile cars, ranging from complete rear axle assemblies to small screws and bolts.

DURING the past few months the Hupp Motor Car Corp. has completed the installation of machinery for a physical test laboratory at its Detroit factory. Realizing the important relationship between tests of actual motor vehicle parts and manufacturing, and in order to avoid delays incurred by sending such parts outside for tests, the new laboratory has been equipped to handle practically all parts used in the manufacture of Hupmobile cars, ranging from complete rear axle assemblies to small screws and bolts. Moreover, fixtures for the machines installed have been so designed as to subject the actual parts to the tests desired rather than the taking of test specimens and obtaining data for the complete unit by calculation.

About $20,000 has been spent for machinery, including:

1. Tinius Olsen tension machine, for tensional, compression, and transverse tests.
2. Tinius Olsen torsion machine for testing all parts subjected to torsional or twisting stresses in the cars.
3. Charpy impact machine, which at present is used largely for research work, but which will probably be adapted for tests on actual parts.
4. Tinius Olsen ductility measuring apparatus for use in testing sheet steel used in bodies, etc.
5. A machine, designed by Hupp, for measuring whip in such parts as propeller shafts, etc.
6. Spring compression testing machine, for measuring deflection of springs under varying loads.

A recording apparatus forms an integral part of the Tinius Olsen tension machine, recording elongation or compression against pounds tension or compression applied. Tests are made on this machine on a wide range of parts, from small screws and bolts, up through connecting rods, finished pistons and pin assemblies, and front axle I-beams. Connecting rods under tests are assembled with the piston pin in place, the upper fixture holding the pin. The lower end of the rod is held by a plug simulating the crankpin. Similar mountings are used for testing all parts, so as to reproduce as nearly as possible the application of stresses under service conditions. Transverse tests on front axle I-beams are now made in two directions, as the introduction of four-wheel brakes has developed a new factor to be considered, that of the center of the I-beam bowing forward with the application of the brakes.



A section of the newly completed physical testing laboratory of the Hupp Motor Car Corp. Note the simple apparatus along the back wall used for measuring whip in propeller shafts, etc.

Samples of all parts subjected to torsional stresses in a car, such as frame side members, propeller shafts, axle shafts, etc., are tested on the Tinius Olsen torsion machine. Here again a number of fixtures have been developed to make it possible to test actual parts. At the present time, for instance, a test is being made on a complete rear axle assembly with wheels mounted, torque being applied through the regular propeller shaft and universal joints. Such tests are generally always carried to destruction.

In testing sheet steel on the ductility apparatus, a sheet is taken at random from every shipment, three strips being cut out of the sheet, one from each end, and one from the center. On each strip three tests are made, one at either end and the other in the center also. This gives tests on nine well separated points out of the sheet. This has been found necessary due to variance in ductility of sheets at the center and the sides, occasioned by heat-treating. By means of these tests, the laboratory has been enabled to predict in advance very closely the percentage of failures to be expected in actual production.

Hupmobile has developed its own apparatus for measuring whip in propeller shafts. The shaft is driven by a 5 hp. electric motor, and measurement of the amount of whip is made by a gage located near the center of the shaft, at speeds varying between 300 and 3600 r.p.m.

The spring compression machine is used largely for assistance in design, although production tests are also made. Springs are mounted by means of the shackle bolts at either end, transverse pressure being applied in the center.

Naturally the installation of this machinery has enabled the Hupp Motor Car Corporation to carry on research tests on new materials. In addition to the machinery already mentioned, a number of smaller pieces of apparatus are used for this purpose including a Charpy impact device. Such work is generally done in cooperation with the Hupmobile chemical testing laboratory.

It is in regular production testing, however, that the physical laboratory's greatest value is found. By periodically testing a definite percentage of all parts used, a quick check on the quality of materials and workmanship has been supplied. By using the actual parts a great many errors are avoided and the results are of more value from the production standpoint.

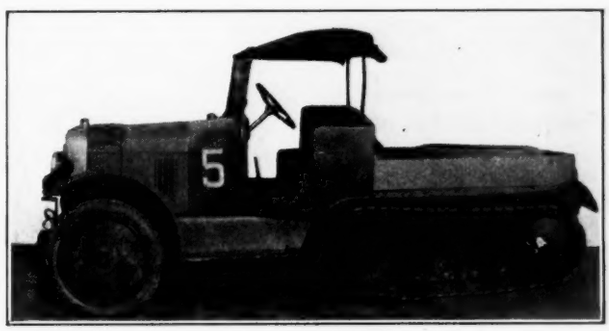
Citroen Demonstrates Improved Type Creeper

AN improved type of rubber and metal flexible creeper track machine built by the Citroen-Kegresse Co. has been taking part with considerable success in the French army artillery tractor competition near Versailles. This competition is to develop tractors suitable for hauling the French 75 mm. and the 155 mm. gun.

The improvements consist in making use of an endless band of fabric and rubber carrying a number of oblong metal plates having a block of rubber set into their upper face and two hardened studs on their under surface which pass through the rubber band and engage with holes on the driving pulley. This gives the advantage of a perfectly flexible band with a positive drive. Formerly there were tongues of rubber on the inner face of this band which were gripped between the lateral faces of the two driving drums on the same shaft and assured the drive. Under certain conditions slip occurred between the rubber and the metal, whereas with the new type slip is impossible and the band need not be stretched unduly. The tongues of rubber are maintained, but they merely serve to guide the band on the pulleys. Further, these tongues are bolted to the band and to the plates on the band, thus tending towards cheaper construction and enabling spuds to be used when necessary.

In addition to these changes in the creeper track, the entire machine has been redesigned. The engine, the frame members and the front axle with front wheel brakes are the same as are used for the Citroen ¾-ton truck. Instead of the driving pulleys being at the rear, as formerly, they are at the front of the band and of increased diameter. The normal Citroen rear axle housing is used with a spiral bevel gear reduction, and in addition there is an emergency planetary gear reduction in the driving pulleys. This provides either three speeds on direct drive, through the spiral bevel gears, or the same three combinations with a second reduction through the planetaries.

During these trials the four Citroen machines, although having a four-cylinder engine of only 2.7 by 3.9 in. bore and stroke, hauled a two-wheel, pneumatic-tired trailer weighing 3520 lb., and representing the weight of a 75 mm. gun, and in addition had a load of 440 lb. on its platform.



Citroen-Kegresse flexible rubber and metal creeper track machine

The rubber track machines, having a road speed of 20 m.p.h., hauled their load over the highway at a higher speed than could be maintained by trucks.

An unusual feature in connection with these trials is the presence of two Renault metal track machines consuming charcoal gas. Tractors proving successful in this competition will be eligible for state subsidies.

THE American Car & Foundry Co. has recently added a new body model to its 230 in. wheelbase mechanical drive chassis line. This model, designated as a Newell type, while frequently found out West, has not until now been introduced in the East. The body has seating capacity for 29 passengers and is characterized by a raised observation section at the rear. Beneath this is a baggage compartment of about 85 cu. ft. capacity, occupying about one-third of the floor space of the coach. Entrance to the observation section is through the front part of the coach, a stairway being provided between the rear seats of the lower deck. This model is adapted chiefly for long cross-country runs.

THE FORUM

Variation of Brake Mean Effective Pressure With Compression Ratio

Knowing b.m.e.p of engine having compression ratio of 3.8 how can the b.m.e.p. of another engine of same type, but with compression of 4.7, be determined?

Editor, AUTOMOTIVE INDUSTRIES:

Will you please explain the relation between the compression ratio and the brake mean effective pressure? In other words, knowing the b.m.e.p. of an engine having a compression ratio of 3.8, how can the b.m.e.p. of another engine of the same characteristics, but having a compression ratio of say 4.7, be determined?

WM. J. WILSON.

Under the usual assumptions made in theoretical discussions of engine pressures the m.e.p. varies in direct proportion to the compression pressure, which varies as the expression

$$\frac{r^{1.3} - r}{r - 1}$$

where r is the volumetric compression ratio.

For $r = 3.8$ this expression has a value of 0.669 and for $r = 4.7$ it has a value of 0.750, hence the (indicated) mean effective pressure should increase in the proportion of 669 to 750 or by 12 per cent.

Owing to the fact that the frictional and pumping losses remain practically the same while the indicated power is increased, the proportional gain in brake mean effective pressure should be somewhat greater. Let us assume, for instance, that in the original engine 25 per cent of the indicated power is lost in mechanical friction and pumping losses and that the absolute losses in power are the same with the higher compression. Then the increase in brake horsepower, and hence in brake mean effective pressure, would be in the proportion of 75 to 87 or 15¾ per cent. Increase in the volumetric compression ratio then leads to a gain in mechanical efficiency and under the assumptions made this efficiency with the higher compression ratio would be

$$100 \times \frac{87}{112} = 78 \text{ per cent (nearly)}$$

instead of 75 per cent.—EDITOR.

Preventing Loss of Alcohol

Editor, AUTOMOTIVE INDUSTRIES:

In *Automotive Industries* of Nov. 11, 1926, page 822, there appeared an article under the heading of "Loss of Alcohol from Radiators." The Editor's note at the bottom of this article has just been called to my attention. The last nine lines of the article read as follows:

> "This is a false impression as there is not the slightest difficulty without entering into any complications or without materially increasing the cost of production in designing a radiator which will handle a mixture of alcohol and water in cold weather at any temperature up to and including the boiling temperature of the liquid in the jacket of the motor without the alcohol being separated from the water and without using any auxiliary devices."

From the above you will see that the article not only refers to systems having liquid at the boiling temperature but to systems which are operated at any temperature. I would like to make the following point clear so that there will be no misunderstanding.

There is not the slightest difficulty in designing a radiator which will handle a mixture of alcohol and water in cold weather at any temperature from the surrounding air temperature up to the boiling temperature of the liquid without the alcohol proportion changing materially in relation to the water proportion. Or, stated in other words, the difficulties which are experienced from loss of alcohol from the type of radiator which is now extensively used is an unnecessary evil and can be easily avoided by correct design.

W. W. MUIR.

Research Associations

Editor, AUTOMOTIVE INDUSTRIES:

My attention has been directed to the very interesting article by Mr. Heldt in your issue of March 5, dealing with industrial research, and incidentally referring to the research associations formed in this country under Government auspices.

In a very brief paragraph on page 356, Mr. Heldt deals with many research associations and specifically with one in the motor car industry, and it has been suggested that his quotation of the complaint, that the results in some cases have been unsatisfactory due to lack of proper personnel, might be taken as a criticism of this association. I feel sure that Mr. Heldt did not intend any such criticism, even were it justified.

In 1920, Dr. Kenneth Mees, of the Eastman Kodak Co., in a very able book on the Organization of Scientific Research, pointed out, before the event, that it was unlikely that cooperative laboratories would be successful in all industries, and the various considerations that he adduced then have been emphasized in many industries during the last seven years.

The discussion of research and its bearings on industry cannot be attempted in a brief letter, but opportunity may be taken to mention the view held by a number of enlightened people, that the research association movement is an experiment in itself and, having regard to the issues involved, an experiment by no means extravagant of expense.

H. S. ROWELL.

(Note: Mr. Rowell is Director and Secretary Research Association of British Motor and Allied Manufacturers, and Director British Motorcycle Research Association.)

Front Drive Design Makes Use of Fifth Wheel for Steering and Power Transmission

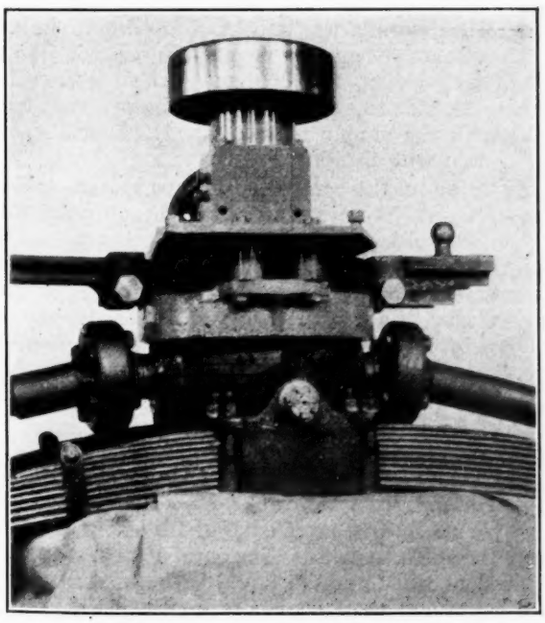
C. M. MARSH of Hudson, N. Y., who has been experimenting with front drives for automobiles for a good many years, has recently built a light commercial car embodying this drive, of which a photograph is shown herewith. The four-cylinder engine is located under the seat and is arranged with the flywheel end forward. It is combined with a three-speed transmission into a unit powerplant.

At the center of the frame in front there is a fifth wheel, by means of which the car is steered and through which the power is transmitted to the front driving wheel. To make the steering easier the fifth wheel is made of the ball-bearing type. The power enters the upper part of the fifth wheel through a horizontal shaft, whence it is transmitted to a short vertical shaft concentric with the fifth wheel by means of a pair of spiral bevel gears. Another pair of spiral bevel gears transmits the power to the differential gear, from which connection is made to each front driving wheel by means of a shaft with two universal joints.

The front wheels are carried on spindles which are supported from the lower member of the fifth wheel by means of three semi-elliptic cross springs—two at the same level below the wheel axis and the third centrally above the axis. A ball stud is fastened into an arm secured to the lower member of the fifth wheel, from which the usual drag link connects to the arm of the steering gear.

Among the advantages claimed for this construction by the inventor are the following: Better acceleration, especially under conditions of heavy going; by providing a transmission brake, four-wheel braking without drums on the front wheels; freedom from skidding and greater stability, due to the three-point support of the chassis frame; reduction in the strains on the chassis due to the three-point support; short turning radius; small unsprung weight both in front and rear; body may be placed very low for stability and ease of loading and unloading.

It is to be expected that automobile engineers will not look very favorably on the fifth wheel method of steering, owing to the heavy shocks which collisions with road obstacles must impose upon the steering mechanism. A number of the features of the design are the subject of patents or patent applications, including the means provided for compensating for the torque reaction on the front axle, so as to eliminate any influence of the driving power on the steering mechanism.



Close-up of the fifth wheel used on the Marsh wagon

Front view of Marsh front-drive delivery wagon

Lockheed Combines Master Cylinder With Supply Tank

Latest type of hydraulic brake compensates automatically for contraction or expansion of liquid due to temperature changes, as well as possible loss by leakage.

IN the latest type of Lockheed hydraulic brake the supply tank and master cylinder are combined in one unit, and any contraction or expansion of the liquid in the system due to temperature changes, as well as possible loss of liquid from the system through leakage, is compensated for automatically.

The unit referred to is known as the Lockheed compensator type of master cylinder; it does away with the separate compensator cylinder usually carried on the forward side of the dash; maintains a constant pressure of 8 lb. p. sq. in. throughout the system, automatically expanding all rubber cups; prevents the ingress of air into the system at the master cylinder, which is immersed in the liquid; makes the system an integral part of the chassis, which need not be removed in the event of service operations on the engine or transmission, and prevents the loss of alcohol from the compensator due to evaporation.

Referring to the two illustrations herewith, one of which is a phantom view of the compensator type of master cylinder, and the other a longitudinal section through the cylinder, it will be noticed that the brake and clutch pedals are mounted directly on this unit. The clutch pedal is mounted on a boss on the case itself, while the brake pedal is secured to the serrated outer end of a short shaft which on the inside of the case carries a lever arm which bears against the piston in the master cylinder. The master cylinder being submerged in the liquid in the reservoir, all air, dirt and water are excluded from the system.

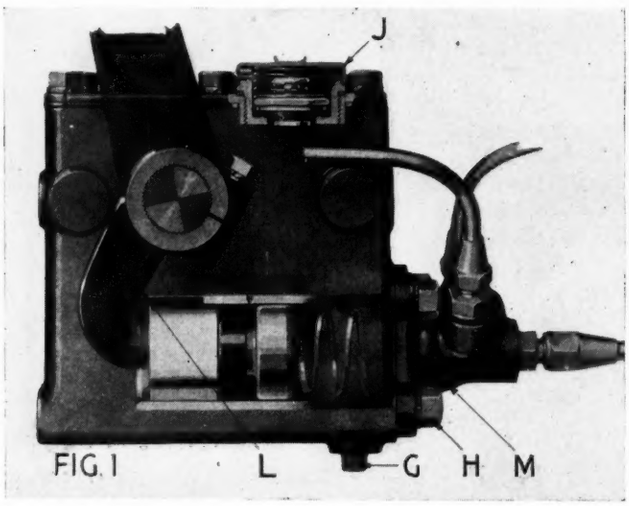


Fig. 1. Phantom view of Lockheed compensator type of master cylinder

In the sectional view of the master cylinder is shown an orifice *B* immediately to the right of the cylinder cup *A* in its normal "off" position, through which orifice liquid can flow freely into and out of the cylinder. When the brakes are released the master cylinder piston is returned to its normal position by a return spring *C* inclosed within the master cylinder. This spring also serves to hold in place at the bottom of the cylinder a combination inlet and outlet check valve. Hence there is a constant pressure in the system, depending upon the pressure of the spring, which in this particular case happens to be about 8 lb. p. sq. in. If the liquid in the system expands by reason of an increase in temperature, this check valve will open and allow some of the liquid from the system to return to the master cylinder and thence through the orifice *B* to the supply tank.

Pressures are Balanced

Within the same check valve body there is an outlet valve *D*, so designed that it will open under a very light pressure. A decrease in the volume of the liquid in the system, caused by a drop in temperature, will produce a difference in pressure on opposite sides of the valve sufficient to open it, thus allowing liquid to be drawn from the master cylinder chamber until the pressures are balanced again. The outlet check valve spring being made so light, it obviates the possibility of air being drawn into the system past the cups of the brake cylinders. Incidentally, the weight of the liquid in the supply chamber prevents a negative pressure being reached in the system, for as soon as the pressure in the system descends to a point equal to the pressure due to the head in the supply tank, the valve *D* will open and the system will fill up.

The operation of the compensator type master cylinder is as follows: By pressing on the brake pedal the master cylinder piston is forced forward, the pressure of the liquid opening the outlet valve *D*, and the liquid flowing into the line. When pressure on the brake pedal is released, the return spring *C* forces the piston back to its original position against the lock-wire stop *E*. This results in a decrease in the pressure on the master cylinder side of the check valve, and the outlet check valve closes.

In order that the master cylinder may be replenished with liquid, a series of drilled holes *K* is provided in the piston, and liquid from the tank enters through these holes and passes by the outer edge or lip of the master piston cup *A*, which turns in. The return springs in the brake cylinders will force the liquid back through valve *F* until a balance of pressure is restored, when the inlet valve *F* will close. Any excess liquid in the master cyl-

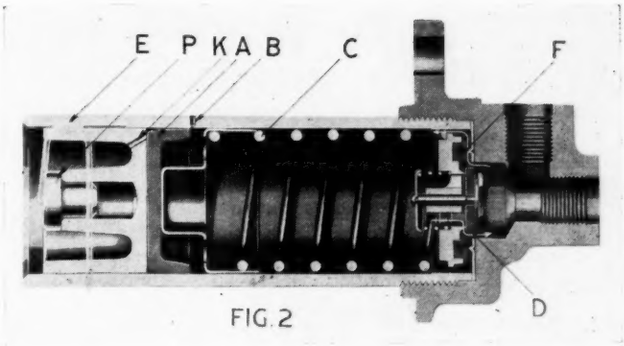


Fig. 2. Sectional view of master cylinder

inder at that time will return to the supply tank through the orifice *B*.

In case a brake shoe return spring should become broken or a brake cylinder piston stick, a negative pressure in the master cylinder will result. This negative pressure is produced by the return spring acting against the master piston cup. However, this same spring holds the inlet valve in place, and as the inlet valve has only one-half the area of the piston, the inlet valve closing pressure per unit of area is greater than the pressure of the piston. This gives a factor of safety, preventing air being drawn into the system at the brake cylinders when one of the brake cylinder pistons sticks. Moreover, the master cylinder cup on its return stroke will by-pass liquid under a negative pressure of approximately 1 lb. p. sq. in., which acts as a further safeguard against air leaks.

In the cover of the master cylinder supply tank there is a check valve *J*, which is similar in design to that in the master cylinder itself. The supply tank is a sealed unit and any loss of liquid from the system therefore must be replaced by air. Any increase in volume of the liquid will compress the air above the liquid level in the tank and create a pressure. A light pressure on the liquid in the tank is not undesirable, but the pressure must not be sufficient to overpower the return springs in the brake cylinders. The combination valve in the tank cover is designed to give relief from both of these conditions. There is sufficient air space in the top of the tank to take care of any normal expansion, and the valve operates only under extreme conditions.

The reason for using a sealed tank is the desire to prevent loss of alcohol by evaporation. If the master cylinder lever is depressed continually, there will be a surge of liquid at each change in the position of the piston, and if an air vent were provided in the top of the tank, the alcohol-laden air would be forced into the atmosphere at each brake application and the total alcohol content would in time be lost.

The design of the master cylinder and valves is such as to make bleeding a very simple operation. By depressing the brake pedal the master cylinder piston is forced outward and a certain volume of liquid is forced into the line through oulet valve *D*. When the pedal is released the return spring *C* forces the master piston to its off position and at the same time holds inlet valve *F* closed. The liquid needed for the second stroke of the piston enters the cylinder from the tank around the edge of the master piston cup. The process of bleeding at the brake cylinders remains the same as before.

Italy Plans Development of Aluminum Industry

IN the same measure as the field of application of the internal combustion engine grows, so the importance of the light metals and their alloys which combine with their lightness good mechanical properties, increases. Among the metals in question aluminum occupies the most important place.

The existence of bauxite in Italy was first mentioned about 80 years ago, when the exploitation of the deposits in the Abrusses began. It was not long before the attention of industrialists was called to the practical utilization of this material, and in 1905 the Italian Co. for the Manufacture of Aluminum installed at Bussi a plant for the treatment of bauxite by the Bayer process.

During the war the consumption of aluminum increased in such proportion that the importation in ingots which had amounted to only 843 tons in 1913, rose to 3996 tons in 1917. In order to meet this demand, and also to increase the national production, a plant for the electrolytic treatment of minerals derived from France was laid down at Villeneuve in the Aosta Valley.

Since that time exploration in other parts of the Appennines has shown the existence of bauxite in these regions, and by the annexation of Istria, Italy acquired bauxite deposits far more important than any previously found in the peninsula.

Bauxite of domestic origin is as yet used to only a very moderate extent in the production of aluminum, in spite of the fact that a company opened a new plant at Bergofranco in 1921, of greater capacity than that at Villeneuve. This is due to the fact that whereas a part of the bauxite extracted in southern Italy serves for the preparation of salts of aluminum, the products of the Istrian mining operations are exported, practically the entire amount being taken by Germany.

The Italian Government has taken steps to prevent the exports of this mineral and to assure for the home industry the quantities which it needs. It has recently been determined that these Istrian deposits are limited, and for this reason it is considered important that the measures provided for be applied as soon as possible, so that the supply may last as long as possible.

The consumption of aluminum in Italy continues to grow and the production is far from keeping step with it, as is shown by the import figures. These imports increased from 19,720 double-hundredweights (220 lb.) in 1923 to 29,467 in 1924 and to 66,930 in 1925, without counting the similarly increasing importation of wires and cables of aluminum and other finished or semi-finished products of the metal.

In view of the considerable increase in consumption a company plans the erection of a plant for the manufacture of aluminum and for the preparation of aluminum compounds at Cotrone in Calabria. The raw material will be Istrian bauxite and the electric power necessary will be derived from the large hydro-electric plant in course of construction which utilizes the water power of the artificial lakes on the Sila plateau. The date at which this new aluminum works can begin production will depend upon the opening of the hydro-electric plant. Italy then will be largely independent of foreign sources of aluminum.

AUTOMOTIVE NEWS SECTION INDUSTRIES

Philadelphia, Pennsylvania

Saturday, April 23, 1927

April Brings Upward Trend in Sales and Production

PHILADELPHIA, April 23—Production in motor vehicle and parts plants continues to go forward at satisfactory levels as the industry goes into the last half of April. A few companies are pushing their manufacturing facilities to the limit in an effort to meet the peak spring demand, but a good many factories are supplying requirements without using their facilities to capacity. Generally speaking, however, the second and third weeks in April have recorded another definite upward trend in production and sales.

All producers, parts makers in particular, are concentrating attention on the possibility of reducing manufacturing costs still further, while there has been a slight downward revision in wage scales in many Detroit plants due largely, it is believed, to the surplus labor resulting from the low rate of Ford production in recent months. There is no tendency on the part of manufacturers to try to get major production economies out of reduced wage scales, however, and earnings for individual workers are expected to remain at a relatively high level in many cases.

April production for the whole industry, exclusive of Ford, will compare favorably with that of last year and may even exceed the 1926 total for that month. A few manufacturers who have been unable to get into production on new models announced some months back are straining every effort to get cars into their dealers' hands in time to take advantage of the peak buying demand of the next few weeks.

Truck sales are continuing at a high level and this branch of the industry seems likely to run ahead of its 1926 total for the second quarter as it did in the first three months of this year.

Form Continental Steel

CANTON, April 20—A merger of the Kokomo Steel & Wire Co., Kokomo, the Chaplin-Price Steel Co., Kokomo, Indianapolis, and the Superior Sheet Steel Co., Canton, was announced here today. The merged company will be known as the Continental Steel Corp., with a capital stock of $15,000,000. H. A. Roemer, president of the Superior company, will be president of the new company; J. E. Frederick, secretary and general manager of the Kokomo company, will be chairman of the board, and Niles Chapman, president of Chaplin-Price, will be chairman of the executive board.

Buick Promotes Sarvis

DETROIT, April 20—Arthur H. Sarvis, service manager of the Buick Motor Co., has been promoted to assistant general sales manager. A successor for the service manager's post has not yet been named.

M. & A.M.A. Indexes Near Record Points

NEW YORK, April 19—Manufacturers of automotive parts and accessories are operating at close to the highest levels on record, the March index of all groups in the Motor & Accessories Manufacturers Association standing at 181, a figure that has been exceeded only once. In October, 1925, the index rose to 188. The service equipment group, however, made a new record in March.

While the industry made substantial gains in January and February, over the low production records of the final quarter of last year, the upward trend in March was even more marked, and it was indicated that April business would be still larger, according to the M. & A. M. A.

Original equipment makers were on a particularly high level in March, the index for this group standing at 195 against 158 in February, 182 in March last year and 214 in October, 1925, the peak for that division.

In shipments to the wholesale and retail trade, the March figure for the replacement parts makers was 120 against 100 in February and 146 in March last year. Accessory makers reached a figure of 135 against 93 and 167, respectively, for the previous periods. Figures for the service equipment makers were 210 against 155 and 205. The previous high month was April of last year, when the index stood at 208.

Informal reports to the M. & A. M. A. indicated that April sales were proceeding in most cases on a basis fairly equal with March and in the case of some companies were running far ahead.

Windsor Plan Progresses

DETROIT, April 20—Chattanooga, Indianapolis, Louisville and Elmira are the latest big American cities to adopt the Windsor plan of merchandising used cars, and dealers of St. Paul are seriously considering it, according to Floyd A. Allen, of General Motors Corp.

March Production Increased to 414,000

WASHINGTON, April 22—Production of cars and trucks in the United States in March totaled 386,721, according to Department of Commerce figures. This compares with 422,728 in March last year. Passenger car production in March this year totaled 341,665 as against 381,116 in March, 1926. Truck production increased to 45,056 as against 41,612.

For the 1927 quarter United States production totaled 919,687 made up of 799,270 cars and 120,417 trucks. In the 1926 quarter the total was 1,077,771, with 973,801 passenger cars and 103,970 trucks.

Canadian figures for March were not available. With Canadian figures estimated, the totals for 1926 and 1927 were as follows:

1926

	Cars	Trucks	Total
Jan.	284,703	33,517	318,220
Feb.	334,524	41,784	376,308
March	399,105	49,386	448,491
Total	1,018,332	124,687	1,143,019
	Cars	Trucks	Total
April	401.836	54,135	455,971
May	394,569	51,568	446,137
June	358,388	47,265	405,653
July	329,959	41,873	371,832
Aug.	393,064	47,836	440,900
Sept.	363,547	51,257	414,804
Oct.	300,160	46,985	347,145
Nov.	226,278	39,430	265,708
Dec.	143,413	30,161	173,574
Total	3,929,546	535,197	4,464,743

1927

	Cars	Trucks	Total
Jan.	208,718	40,788	249,506
Feb.	275,156	41,858	317,014
*March	365,000	49,000	414,000
Total	848,874	131,646	980,520

*Canada Estimated.

Pierce-Arrow and Timken Hold Annual Meetings

BUFFALO, April 18—W. R. Huntley was elected a director of Pierce-Arrow Motor Car Co., succeeding W. P. Cooke at the annual stockholders' meeting. All other directors and all officers were reelected.

CANTON, OHIO, April 21—All officers and directors of Timken Roller Bearing Co. were reelected at the annual meeting this week.

Davidson Succeeds Quirk

NEW YORK, April 21—H. J. Quirk has resigned as field secretary of the Motor & Accessory Manufacturers Association to become affiliated with the National Credit Office, Cleveland. He will be succeeded in the Detroit office by Homer H. Davidson.

Car Makers File Quarterly Reports

Hudson Earnings Increase to $4,026,515—Overland Shows $2,358,806 Total

DETROIT, April 21—Hudson Motor Car Co. reports net income of $4,026,515 after all charges and taxes for the first quarter of 1927. This is equal to $2.52 a share on the $1,596,660 shares of no par stock. In 1926 the report covered the three months to Feb. 28 and showed a net income of $2,746,023 after the same charges, equal to $2.06 a share on the outstanding stock. The fiscal year has been changed to end on Dec. 31.

The increase in earnings totals $1,280,492 or 46.63 per cent. To some extent the 1927 earnings were held low by the fact that the company was getting into production on its new cars in January and that output in that month was considerably below that of February and March. Capacity output was reached in March.

Overland Net Gains 91.2%

TOLEDO, April 19—Willys-Overland earnings for the first quarter of 1927 were $2,358,806 after all current charges including interest, depreciation, local taxes and before Federal taxes, an increase of 91.2 per cent over the same period for 1926 in which earnings were $1,233,826. This is equivalent to 81 cents per common share after preferred dividends, as compared with 36 cents for the first quarter last year.

Production for the first quarter was 56,564 cars, a gain of 23.8 per cent over the first quarter last year. April production and sales to date are approximately equal to the entire month of April, 1926, which totaled 19,361 cars. The present schedule for the month will establish a new record, says an official statement.

Shipments for March were third largest in the history of the company. President John N. Willys stated sales conditions in every part of the country continue to point to a highly satisfactory year.

Hupp Income $485,579

DETROIT, April 21—Net income of Hupp Motor Car Corp., in the quarter ended March 31, was $485,579 after depreciation and Federal taxes, equal to 48 cents a share on 1,005,189 shares of common stock, against $1,122,307 or $1.22 a share on 913,809 shares in the first quarter of 1926.

Net sales were $12,783,161 in the quarter against $14,437,693 in the corresponding quarter last year.

No Studebaker Price Change

SOUTH BEND, April 20—Mystery surrounding the recent statement of A. R. Erskine, president of Studebaker Corp. of America, at the annual meeting April 5, that the corporation would have an important announcement April 17, was cleared by the sending to stockholders of a letter disclosing important stock car records set by a Studebaker Commander model. The report of the coming announcement gave rise in some quarters to a belief that a price reduction was to be made.

Dodge Brothers Net is $1,545,348 in Quarter

DETROIT, April 21—Net income of Dodge Brothers, Inc., for the quarter ended March 31, was $1,545,348, the statement issued today reveals. Of this amount $1,465,625 was required to provide dividends for preferred stock, leaving a remainder of $79,773 for the common stock. The latter sum has been added to the earned surplus bringing the total to $25,651,112. Net earnings after depreciation were $2,765,103 from which was deducted $1,219,754 for Federal taxes and interest on the 5 per cent serial notes and the 6 per cent gold debentures.

Hoopes to Manufacture Parker Bus-Truck Wheel

PHILADELPHIA, April 20—Hoopes, Bro. & Darlington, Inc., of West Chester, Pa., have closed a contract with the Parker Wheel Co., under which it will manufacture Parker spider type wheels for use on trucks and buses on a production basis. The company reports several orders now on hand for Parker wheels and it is preparing its factory for production in the immediate future.

The company will continue its manufacture of wood spoke metal felloe wheels for solid tires, the Parker wheel giving it a wheel for dual pneumatic tires. The Parker company has been manufacturing these wheels for several years in small quantities and they have been used successfully on several makes and types of trucks.

Chandler Adds Coupes

CLEVELAND, April 20—Chandler-Cleveland Motors Corp. has added country club coupe models to its big six and royal eight lines, the former listing at $1,695 and the latter at $2,195. Two color options are offered. Upholstery on the big six model is blue-gray, deep-tufted mohair, and on the royal eight either blue gray mohair or champagne-toned broadcloth.

N.A.C.C. Issues Pamphlets

NEW YORK, April 20—The truck committee of the National Automobile Chamber of Commerce has just issued two pamphlets, one telling of the application of the Jersey Central Railroad to use buses on one of its short lines instead of trains, the other telling of practical methods of getting business for common carrier truck lines. Copies of these may be had on application to the chamber headquarters.

Business in Brief

Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co.

NEW YORK, April 20—Trade recovery was considerably hampered last week by bad weather in numerous localities, particularly in the Mississippi Valley, where severe floods have affected wide areas. The approach of Easter naturally stimulated retail business, especially in the East. The level of commodity prices declined, while stock quotations showed greater irregularity, although the general trend continued upward. Money rates advanced slightly.

General industrial activity last month, as computed by the "Electrical World" on the basis of electric power consumption, was 4.9 per cent lower than in February and 3.5 per cent below the level of March last year. The average for the first quarter is 3.9 per cent lower than a year ago.

FREIGHT CAR LOADINGS

Railway freight loadings during the week ended April 2 reflected the effects of the coal strike, numbering only 992,745 cars, as against 1,008,888 cars in the preceding week and 928,303 cars in the corresponding period last year.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended April 13 were 12.8 per cent smaller than the total for the preceding week but 10.1 per cent above that for the corresponding period last year.

FISHER'S INDEX

Fisher's index of wholesale commodity prices stood at 140.1 last week, as against 140.9 a week earlier and 139.6 four weeks earlier.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve banks increased $54,700,000 during the week ended April 13, with gains of $23,800,000 in discounts, $17,500,000 in open market purchases and $13,400,000 in holdings of Government securities. Note circulation rose $16,400,000, deposits $41,800,000 and reserves $7,500,000. The reserve ratio declined from 79.7 to 78.8 per cent.

Loans of reporting member banks during the same period declined $52,000,000 and investments $25,000,000, while borrowings from the Federal Reserve banks increased $29,000,000, net demand deposits $17,000,000 and time deposits $20,000,000. Loans to brokers and dealers, secured by stocks and bonds, made by reporting member banks in New York City increased $22,000,000.

The call loan rate ranged from 4¼ to 4½ per cent last week, as against 4 to 4½ per cent a week earlier. Time loan rates were unchanged at 4⅜ to 4½ per cent, while rates on commercial paper were slightly higher at 4 to 4½ per cent, as compared with 4 to 4¼ per cent in the preceding week.

Tire Price Raise Seen by Factories

Tentative New Price Lists Prepared by Many Companies—Sales Hold High

AKRON, April 18—There is a strong probability that tire prices will be increased within the next 30 days, in the opinion of Akron manufacturers. The crude rubber market has shown increasing strength during the past month, and, according to forecasts of British producers, will go higher during the next few months.

Many tire companies have tentative new price lists ready to be released to the dealer trade as soon as an upward movement is started. This development probably will materialize before May 15, it is believed.

Preliminary figures indicate that more than 17,500,000 pneumatic casings were shipped by manufacturers to dealers during the first quarter of this year, compared with 11,000,000 casings for the corresponding period of 1926. Shipments are expected to exceed 20,000,000 casings for the second quarter.

There is no longer any doubt that the rubber and tire industry has made a substantial recovery from the adverse conditions which left it groggy at the close of 1926. Early last year a backward spring, a falling crude rubber market, prevailing high tire prices, and a strenuous and effective government campaign of propaganda to encourage tire conservation combined against the industry and to defeat normal sales through retail channels.

The public attitude now is quite opposite to the buying apathy upon the part of both dealer and consumer a year ago. Recognizing that tire prices are the lowest in history, with values greater than ever, and are in line for an advance, dealers and motorists have been buying aggressively. Retail prices were reduced five times last year.

The great strides made so far this year have caused manufacturers to forecast the sale of 70,000,000 pneumatic casings during 1927, compared with approximately 60,000,000 in 1926.

Rubber Stocks Increased by Low Consumption Rate

NEW YORK, April 18—Continued quietness of the rubber market, with a tendency toward slightly lower prices, occasioned this week an analysis by Henderson, Helm & Co., tending to show that during the remaining months of the year world consumption should be in excess of shipments to the extent of over 4000 tons a month.

As previously pointed out in *Automotive Industries*, a further cut of 10 per cent in exports from the restricted area, beginning May 1, is inevitable. At that time, all of the unused coupons except those representing about 9000 tons carryover in Ceylon will have been used up.

Total world stocks are estimated at about 245,000 tons, but a substantial proportion of this is a regular floating supply, the result of the long distance between producing and consuming countries. Stock actually on hand in America and Europe is approximately 160,000 tons.

Total average shipments per month for the balance of the year, from all points, are estimated at about 44,200 tons, against an average consumption per month for all countries of 48,500 tons.

Dealer Tire Stocks Show Gain in Year

WASHINGTON, April 18—The average American tire dealer carries in stock 68 casings, 33 balloon casings, 144 inner tubes and 24 solid and cushion tires, it was reported here this week by the U. S. Department of Commerce following its sixth semi-annual survey of stocks of tires and tubes.

The survey showed that on April 1 the average stocks held by dealers were 4.9 tires higher than a year ago and 6.6 tires higher than two years ago. Stocks of balloon tires show an increase of 50 per cent over April 1, 1926.

Inner tube stocks were lower than in 1926 but higher than for 1925. Less than 1500 dealers carry more than 100 casings in stock, the greater number carrying from 10 to 25 at a time.

This year 25,867 dealers reported a total of 1,780,034 casings in stock, as compared with 2,056,472 reported by 32,184 dealers last year. A total of 17,472 dealers reported 591,419 balloon casings in stock, as compared with 399,808 carried last year by 18,284 dealers.

Reports of 25,452 dealers showed 2,920,584 tubes in stock, as compared with 3,839,799 tubes last year reported by 32,112 dealers. A total of 31,083 solid and cushion tires was reported this year by 1274 dealers, as against 50,230 carried last year by 1866 dealers.

Value of Tire Business Gains 100% in 4 Years

AKRON, April 20—An increase in total money volume of business of nearly 100 per cent is revealed in reports of 14 tire manufacturing companies in the Akron district during the past four years. These concerns show substantial gains in net profits in 1923, 1924 and 1925, but many barely made expenses in 1926.

Crude rubber reserve funds set up in 1925 were wiped out in 1926 by losses on high priced rubber. Profits shrank and in many cases disappeared entirely. The same manufacturers who in 1925 on sales of $519,746,634 reported net income after all charges of $55,775,261, actually earned scarcely more than $10,000,000 on sales of close to $600,000,000 in 1926. Total sales of these concerns were $323,993,119 in 1923 and $593,225,774 in 1926.

$8,000,000 Earned by Frigidaire in 1926

Sloan Statement Declares Earnings More Than Needed for G.M. Preferred

NEW YORK, April 18—The first indication of what Frigidaire business means in money to General Motors Corp. was given by President Alfred P. Sloan, Jr., in a statement last week that earnings from electric refrigeration in 1926 were more than sufficient to pay dividends on all General Motors preferred stock during the year.

As the corporation last year paid in dividends on its preferred and debenture stocks $7,645,287, Frigidaire earnings may be estimated at around $8,000,000, or about 4.5 per cent of the $178,585,895 reported as the amount earned on the common stock of the corporation, including the corporation's equity in the undivided profits of various affiliated and subsidiary companies.

1927 to Double Earnings

The 1926 record of Frigidaire earnings ought to be doubled in 1927, according to Mr. Sloan, who added that the corporation has $100,000,000 invested in electric refrigeration. As General Motor's total investment is nearly $600,000,000, the return from refrigeration would seem to be lower than the average from the whole business of the corporation.

E. G. Biechler, president of Frigidaire, addressing dealers and salesmen at a convention in Dayton last week, announced that sales for the first quarter were more than 64,000 Frigidaires against 34,000 in the first quarter of 1926. The May schedule is 50,000 units, daily output having been stepped up recently to 2000 units.

To Make Battery Plates

TUSCUMBIA, ALA., April 19—The Muscle Shoals Hazlett Battery Plate Co., recently organized and incorporated here by a group of Tuscumbia business men, has announced plans for the immediate erection of a plant to manufacture battery plates, having a daily capacity of about 75,000 plates. All machinery and equipment for the plant has already been purchased. Capital stock of the company is given at $37,500.

Springfield Plant Active

SPRINGFIELD, OHIO, April 18—Good sized foreign shipments are being made from the Springfield factory of the International Harvester Co., to various points in the United States. A normal force is being employed. Indications are that the Springfield plant will be soon called upon for heavy production. The various buildings have been repaired and new equipment has been added.

Mexican Market Takes More Trucks

Car Imports Show Increasing Demand For Higher Priced Passenger Vehicles

LAREDO, TEXAS, April 18—It is shown by the custom house figures here that 83 cars of automobiles were exported to Mexico through this port of entry during the month of March. It is estimated that the total number of automobiles contained was approximately 526. The value of the automobiles ranged from $1,200 to $1,500 each, which shows that the Mexican trade is going in for higher priced American cars than formerly.

Most of the shipments were destined for Mexico City, Monterey, Guadalajara and other large cities of that country. No reports are available as to the number of automobiles exported to Mexico during March through the other ports of entry, but it is estimated that they did not total more than the number which passed through Laredo.

It is stated that an unusually large number of motor trucks are now being purchased in the United States for use by mines and other industries of Mexico. This increase is due to the shortage of railroad cars in that country and the unsatisfactory condition generally of rail transportation, it is explained.

Texas Sees U. S. Approval of New Highway Program

WASHINGTON, April 18—The Federal government and the highway department of Texas have adjusted their difficulties over a misunderstanding of the Federal aid program, it was announced here this week by the U. S. Bureau of Public Roads.

"Federal aid for highways in the strictly legal sense was not withdrawn," it was explained. "On account of existing conditions, among which was a lack of state funds for new construction, the Federal bureau ceased to approve projects. The Texas highway department has now requested a resumption of approval of projects for new construction."

E. W. James will leave Washington this week to represent the bureau in Texas and to work with the state highway department and the district office of the bureau in framing the future program.

Tractor Sales Decrease

ATLANTA, April 19—Tractor and power farming implement sales in the southeastern district during the first quarter of this year were not only less than were such sales during the corresponding period of 1926 but also were somewhat less than normal for this period, due to adverse conditions which have affected both industrial and agricultural activity in this section.

Sales of equipment in the agricultural field are reported to have been particularly slow, as the low cotton prices for last season's crop have served to materially reduce the buying power of southern farmers, and thus seriously affected their purchases of other than absolutely essential items. Industrial sales of tractors to factories, lumber firms, etc., also were below the level of the first quarter of 1926, but on the other hand were practically normal, as business in this field last year was unusually brisk. Present indications are that sales for the year will be below the normal level.

Employment Shows Increases in March

WASHINGTON, April 19—While there was a general improvement in employment conditions throughout the country during March, the increase was not as large as had been expected, owing to inclement weather which interfered with outdoor work, except in the automotive industry which in general engaged additional help and in some cases increased the operating time of factories, it was reported here this week by the U. S. Department of Labor.

The major industries operated on satisfactory schedules in most instances. The outlook for April was reported to be bright, with increased operations and employment expected in the larger industries and in such outdoor programs as road construction.

In Michigan factory production increased in March and some of the automobile plants increased operating schedules. There was some improvement in the automobile tire industry in Ohio during the latter part of March. Wisconsin showed an increase in production of automobiles.

Republic Sales Gain 40%

ALMA, MICH., April 18—Sales of Republic trucks in March increased 40 per cent over sales in the same month last year, reports J. C. Haggart, Jr., vice-president of the Republic Motor Truck Co., Inc. Deliveries in April and May will show increases over March, he declared. The addition of the new 50 and 60 six-cylinder models has had a large part in bringing in new business, he said.

Export sales in March increased 150 per cent over February, according to E. J. Demaray, foreign sales manager of the company.

Chance Vought Gets Award

WASHINGTON, April 18—The U. S. Navy Department this week awarded a contract for 33 new type observation planes for the Navy and Marine Corps to the Chance Vought Airplane Co., of Long Island City, N. Y. The contract involves an estimated sum of $687,518.

Grant Says Factors Favor Large Sales

Finds Unusual Activity in All Parts of Country on 15,000 Mile Sales Trip

DETROIT, April 18—R. H. Grant, vice-president and general sales manager of the Chevrolet Motor Co., who has just concluded a series of 21 nation-wide sales meetings which brought him in close contact with business conditions from coast to coast, is of the opinion that 1927 will witness excellent business. The meetings required 15,000 miles of travel over a period of three months.

"Business conditions over the United States, as we saw them in the first three months of the year, more than justified the optimistic forecasts made last December," said Mr. Grant. "Trade activity and soundness in the early months have demonstrated the accuracy of the opinion that the year should be an excellent one for American business.

"Every factor that should contribute to good business is at hand. Everywhere we found optimism and confidence amid unusual activity for the time of the year. Everywhere was reflected the financial stability of the country.

"Excellent reasons for the belief that prosperity will attend trade throughout the year are found in every section of the country. Crop diversification has helped the South. Plenty of rain and snow in the Pacific Coast region, the last part of the country to be visited, assured good irrigation for crops in that territory. Increased employment in the industrial sections of the Middle West is giving those regions greatly increased buying power. Strides in the direction of further diversification in the Northwest should make the grain country a bigger factor in the buying market. The corn belt too is preparing for its biggest season."

British Industry Shows Sound Gains in March

WASHINGTON, April 18—Automobile and motorcycle production and sales in the United Kingdom increased substantially in March, according to word received by the U. S. Department of Commerce here.

Despite the increases, however, the English automotive industry is in a state of uncertainty owing to the possibility of tax changes under the new budget and because of substantial increases in the sale of American makes of cars.

Sport types have been in larger demand but closed cars also have sold well. The used car situation is becoming more acute. A bill is pending in Parliament for licensing of filling pumps, so as to give the highway authorities power to prescribe conditions under which pumps may be erected.

Men of the Industry and What They Are Doing

G.M. Export Names Tessen to Head Sales in Berlin

C. A. Tessen, who has been placed in charge of sales in Berlin for General Motors Export Co., said the factors in American cars which appeal most to German buyers are: Use of real leather, nickel fittings, high grade upholstery in closed cars, attention to finish and appointments and four-wheel brakes.

Additional attractiveness of American cars as compared with those of foreign make have brought large increases in sales. In 1924, Mr. Tessen said, American car imports made up 18.8 of the total German registration. Imports in the first few months this year have increased to 70 per cent of the total registration.

Mr. Tessen formerly represented Ford in Copenhagen and Brazil.

Herold and Redman Join Bosch

Matthew J. Herold has been appointed special field representative of the American Bosch Magneto Corp., specializing upon development of new field contacts for the Bosch shock absorber. Mr. Herold formerly was sales manager of the United States Electric Tool Co. James E. Redman has joined the Bosch organization as assistant to the president. Previously he had been connected with the Biflex company.

Weldon Joins Lasco on Coast

C. L. Weldon has been appointed to head the interests of the Lasco Corp. on the Pacific Coast, resigning as general sales manager and vice-president of the Grand Rapids Show Case Co. to take over the new work. Lasco will begin manufacturing operations on the coast about May 1. Mr. Weldon will work in close cooperation with the sales organization of the John Warren Watson Co. which handles the sale of Lasco products on the coast.

Campbell Heads Kelsey, Ltd.

Malcolm G. Campbell, secretary and general manager of the Kelsey Wheel Co., Ltd., Windsor, has been elected president to succeed the late John Kelsey. Mr. Campbell became associated with the Kelsey business in Detroit in 1906 and on the formation of the Canadian company in 1913 he was made secretary and general manager. He is also a director of the parent organization.

Kroha Joins O'Brien

John J. Kroha has joined the O'Brien Varnish Co., of South Bend, as manager of the automotive division. Previous to becoming connected with the O'Brien organization, Mr. Kroha was affiliated with the lacquer division of the Pittsburgh Plate Glass Co.

Bitting is Named Bunting Sales Head

George L. Bitting has been appointed directors of sales of the Bunting Brass & Bronze Co., taking over his new duties at once. Mr. Bitting has been identified with the industry for the past 15 years, recently serving with the Standard Welding Co. and the Eaton Axle Co. and is a widely known sales executive. He has had a long and successful career in selling to the industrial and mechanical markets.

King to Leave Goodyear

Lucian L. King, advertising manager of the Goodyear Tire & Rubber Co. for the past 15 years, has announced his resignation from the Goodyear organization effective May 1. Mr. King has been with the Goodyear advertising department since 1911 and was named manager shortly after becoming identified with the Akron Rubber Company. He has been a director of the Audit Bureau of Circulations for many years, Goodyear representative in the Association of National Advertisers, and other like organizations. While his plans are not yet complete, Mr. King stated that he would take up the selling of outdoor advertising.

Kaufmann Succeeds Larson

Harry A. Kaufmann of Detroit has been made general sales manager of the F. B. Stearns Co., succeeding F. T. Larson. Mr. Kaufmann took charge of sales immediately. He has had 17 years' experience in automotive merchandising and comes to Stearns from Dodge Brothers where he was director of the special equipment division of the Dodge and Graham line.

Kelly Named Vice-President

Election of D. H. Kelly as executive vice-president of the Electric Auto-Lite Co. was announced here following the annual meeting of the organization. This new arrangement will not affect Mr. Kelly's activities as executive vice-president and manager of the U. S. Light & Heat Corp., Niagara Falls, N. Y.

Staniar Heads Board

William Staniar, belting and transmission engineer of the E. I. duPont de Nemours & Co., has been made chairman of the board of advisory engineers of the Power Transmission Association. Serving with him on the board will be R. W. Drake, electrical engineer of the McCormack Works, International Harvester Co. Other members will be named later.

White Promotes A. L. Hayes and Adds New Districts

With the appointment of A. L. Hayes by the White Co. as assistant to the vice-president of the central region, several important changes in district and regional offices are announced. Mr. Hayes will be succeeded as Cleveland district manager by John Voelker. The Toledo and Columbus branches, formerly part of the Cleveland district, have been created separate districts with Armin F. Ling and C. S. Carris district managers in the respective cities.

R. T. Fullerton has been appointed branch manager at Erie, Pa., and G. G. Hegan, C. D. Healey and S. J. Jackson have been appointed service managers at Buffalo, New Haven and Tampa, Fla., respectively. C. W. Griffin, F. W. Beam, R. K. Norman, J. D. Lostritto, W. J. Treichler, G. N. Chambers and G. N. Hermeston have been appointed service superintendents at Providence, Rochester, Utica, Waterbury, Reading, Wilkes-Barre and Winnipeg.

Gaulke Heads Division

William H. Gaulke has resigned his connection with the Western Metal Specialties Co. of Milwaukee, to become chief engineer and general manager of the steel products division of Cream City Boiler Co., Milwaukee, manufacturer of automotive and industrial sheet metal parts. The company is reorganizing its plant and installing a complete line of sheet metal working machinery.

Rogers Philadelphia Manager

Edwin B. Rogers has been appointed manager of the Philadelphia district office of the U. S. Department of Commerce and has taken over his new work, coming direct from 10 years' travel abroad in the interest of American foreign trading interests.

Hart Succeeds McDonaugh

Philip Hart, who has been identified with the Kelly-Springfield Motor Truck & Bus, Inc., has been appointed acting sales manager, succeeding C. G. McDonaugh, who has resigned as director of sales, it is announced.

Barrett Named Executive

W. F. Barrett has been elected vice-president of the Union Carbide & Carbon Corp., Toronto, Ont. He is president of the Prest-O-Lite Co., Inc., Dominion Oxygen Co., Prest-O-Lite Co. of Canada, Ltd., and others.

McDowell Chicago Manager

D. M. McDowell has been appointed manager of the Chicago office of the Chambersburg Engineering Co. His headquarters are at 549 West Washington St.

Registrations Show Increases in March

Indiana Business Gains 27 Per Cent — New York Sets March Record

INDIANAPOLIS, April 16—Indicating a strong pick-up in business for automobile retailers in the state, new car sales in March for Indiana, as revealed in registrations compiled by the Indianapolis Automobile Trade Association, showed a gain of 57 per cent over February of this year and a gain of 27 per cent over March of 1926. The number of new car registrations in March was 10,389 against 6593 and 8136 for the preceding February and January respectively.

The big acceleration in March made the first quarter of this year 30 per cent ahead of the corresponding quarter of 1926.

Practically all makes scored sharp gains in March. Ford gained over February but failed to equal January's sales while other light cars, Chevrolet in particular, cut in deeply on Ford's proportion of the total. Ford's figure for March was 2703 against 2392 for Chevrolet, comparing with 2289 for Ford in February against 1446 for Chevrolet, and 3083 for Ford in January against 1571 for Chevrolet.

New York Sales Set Record

NEW YORK, April 19—March sales of new cars in the metropolitan district, including Greater New York and five nearby counties, set a new record for the month, according to Sherlock & Arnold's figures. Total sales were 13,039 against 5105 in February and 12,290 in March, 1926, all price classes contributing to the gain.

Michigan Registrations Lower

DETROIT, April 19—According to figures compiled by the Michigan Automotive Trade Association, 9690 new automobiles were titled in Michigan in February compared with 10,865 in February, 1926. The sale of cars for the first two months of the year aggregated 17,184, compared with 19,177 for the same period last year.

The figures reveal that Ford's business in Michigan dropped off nearly half while Chevrolet nearly doubled its business. During the first two months there were 3501 new Fords registered compared with 6827 last year while for the same period 4422 new Chevrolets were titled compared with 2475 last year. Essex was another of the popular priced cars to nearly double its business compared with last year.

Dunlop Shows Profit

LONDON, April 3 (*by mail*)—The annual report of the Dunlop Rubber Co. shows a profit from its American subsidiary, the first since the American company was organized. The American profit is declared small but the progress of the company is called satisfactory. The British company reports its gross trading profit in 1926 as £2,711,419 which compares with £3,207,611 in 1925 and £1,763,973 in 1924. Profits for the McIntosh group of companies are not reported.

Chrysler Sales Run 39% Ahead of 1926

DETROIT, April 19—Stockholders representing about 86 per cent of the stock of the Chrysler Corp. at the annual meeting this week elected the following directors for the coming year: W. P. Chrysler, J. S. Bache, J. C. Brady, Harry Bronner, Hugh Chalmers, Delos W. Cooke, Allen F. Edwards, B. E. Hutchinson, W. F. Kenny, D. R. McLain, Giles W. Mead, W. Ledyard Mitchell and E. R. Tinker.

Speaking of the company's progress, Mr. Chrysler told the stockholders that production and sales continue to run ahead of last year and are establishing new records. To date this year, retail sales are 139 per cent of the retail sales for the corresponding period of 1926. Stocks of cars in dealers' hands are moving freely to the public and a shortage of some models exists.

Prospects indicate that Chrysler's earnings for the first quarter will compare favorably with those of the corresponding period last year.

Jordan Output Brought to Eighty Cars Daily

CLEVELAND, April 18—Jordan Motor Car Co. will boost production from 50 to 80 cars a day this week. This is factory capacity. For some time the plant has been producing 50 eight-cylinder cars a day. Now it will also produce 30 of the new small custom cars daily, bringing production to 80 cars. The reduction of the price of the eight and the introduction of the new car created a large demand with the result that the middle of April found the company with 1800 orders on its books. Sales of eight-cylinder cars by dealers are exceeding production by about 30 per cent, according to report.

Stutz Wins Verdict

INDIANAPOLIS, April 20—A verdict in favor of Stutz Motor Car Co. of America, Inc., in the suit brought by the receiver of the Weidley Motor Co., was returned this week. A counter suit filed by Stutz against Weidley was withdrawn following announcement of the verdict.

Gardner Adds Distributors

ST. LOUIS, April 20—Twelve new distributors have been added by Gardner Motor Co., Inc., in foreign countries during the past month. Six of the appointments were in the Dutch East Indies, three in Canada, and one each at Sydney, Australia; London, England, and Havana, Cuba.

Financial Notes

American Chain Co., Inc., and subsidiaries for year ended Dec. 31, 1926, show net income of $2,414,890 after depreciation, amortization, interest and Federal taxes equivalent to $4.09 a share earned on the combined 340,143 shares (par $25) of 8 per cent Class A stock and 250,000 no par common shares. This compares with $2,401,376 or $4 a share on the combined 350,000 shares of Class A stock and 250,000 shares of common outstanding in 1925. If net income of $2,414,890 be applied directly to Class A shares, earnings are equal to $7.10 a share on this stock, as compared with $6.86 a share in previous year. After annual dividends of $2 on Class A and common stocks, both issues share equally in any further distribution.

Martin-Parry Corp. reports a net income of $141,823 for the six months ended Feb. 28, after taxes. Its income was $517,842 for the 12 months ended on Aug. 31, 1926. The profits for the six months were equal to $1.13 a share earned on 125,000 outstanding shares. In the quarter ended on Feb. 28, net earnings were $2,303, equivalent to 2 cents a share against $139,520, or $1.11 a share in the previous quarter, and $50,415 or 40 cents a share in the corresponding quarter of 1926.

Chicago Pneumatic Tool Co. for the quarter ended March 31, 1927, reported net profit of $210,277 after depreciation, interest and Federal taxes, equivalent to $2.21 a share earned on 94,994 shares of stock. This compares with $199,146 or $1.90 a share on 104,553 shares of stock outstanding in first quarter of 1926.

Eaton Spring & Axle Co. reports for the quarter ended March 31, 1927, profit of $274,853, after charges but before taxes, compared with $203,636 in the first quarter of 1926. The company has outstanding 250,000 no par shares of common stock.

Studebaker to Take Over Distribution in France

PARIS, April 9 (*by mail*)—Blake Ozias, French distributor for Studebaker, trading as the Sadeo Co., ceased business this week. During the two years he has been handling Studebaker cars in France Ozias built up an important business and established a model service station on American lines at Neuilly, in the suburbs of Paris. He was responsible for the introduction of the Erskine at the last Paris show. It is understood that Studebaker intends to open its own selling branch in France and E. Waters, the European manager, who has his headquarters at Brussels, is expected shortly in Paris.

C. K. Powell, formerly Oakland and Chevrolet dealer in Paris and more recently connected with the Studebaker organization, has formed a company in Paris for supplying American or European automobiles to American tourists. The cars are sold outright, and are delivered at any European port ready to take the road, the company agreeing to repurchase them, at a predetermined price, according to distance covered, when their users return.

Bus and Truck Regulation on U. S. Chamber Program

Will Act on Norristown Resolution Urging Federal Control of Interstate Vehicles — Toll Bridges and Car Confiscations Also Set for Consideration

WASHINGTON, April 21—Three questions of major importance to the automotive industry and the truck and bus users of the country are given prominent places on the program of the forthcoming fifteenth annual meeting of the Chamber of Commerce of the United States which will meet here May 2 to 5, inclusive.

These questions are (1) a proposal for Federal regulation of interstate bus and truck transportation; (2) highway development, and (3) a proposal that motor traffic regulations should be uniform throughout the United States. Of secondary importance is a resolution which will be submitted by the Bridge Committee of the chamber proposing that all toll bridges, where necessary, should be financed through public bond issues or should be constructed by private parties, and that as soon as they are paid for should be turned over to the state highway systems where located.

Probably of first concern to the automotive industry is a twin resolution offered by the Norristown Chamber of Commerce, which asks that the U. S. Chamber go on record indorsing Federal regulation of interstate bus and truck operation and also for uniform traffic regulations. The Norristown resolution reads as follows:

"Whereas, The interstate transportation of freight and passengers by motor trucks and bus has developed enormously within the last few years and,

"Whereas, Such interstate transportation of freight and passengers is not regulated or controlled by any existing legal authority. Therefore be it

Propose Uniform Regulations

"RESOLVED, That the Norristown (Pa.) Chamber of Commerce request the Chamber of Commerce of the United States to present this matter before its membership with a view of urging Congress to enact suitable legislation to place interstate motor truck and bus traffic under the same legislative authority as other public utilities doing interstate business, and further, be it

"RESOLVED, That the Norristown Chamber of Commerce would suggest that some action be taken looking to the uniformity of traffic regulations in the different states and that such uniformity be extended throughout the States."

Another question which has occasioned automotive dealers and agents much concern, in view of recent court decisions, is that of confiscation of vehicles, the Supreme Court having held in three cases that a conditional sales agreement must be subrogated to the provisions of the liquor laws which provide that automobiles carrying liquor on which the tax has not been paid can be libeled by the United States government and destroy the vendor's lien. Recognizing this as unjust practice and looking for a remedy, the National Association of Finance Companies has submitted a declaration that the government's enforcement of the liquor laws should be under the Volstead Act and not under the Revenue Act.

Volstead Act Recognizes Lien

Under the Volstead Act, where automobiles are confiscated, the act provides that the vendor's lien may be recognized, but under the Revenue Act, the law provides that ships and vehicles carrying liquor on which revenue license stamps are not affixed, shall be libeled to the government.

The taxation committee of the chamber has proposed a declaration that corporation income taxes should be brought more nearly into line with the other income tax schedules and that excise taxes on passenger cars should be eliminated.

Highway development and the new trend in transportation, the chamber announces, will be two of the major topics on the program of the transportation and communications meeting.

That these questions will receive the attention of the leaders in the automobile industry is indicated by an announcement made by the Washington office of the National Automobile Chamber of Commerce, to the effect that Roy D. Chapin, Alfred Reeves, A. J. Brosseau, F. J. Haynes, T. R. Hahl and H. H. Rice, with other leaders in the industry will be in attendance during the sessions.

Bulgarian Sales on Long Terms

WASHINGTON, April 16—Increased credit allowances are being made on foreign sales of automobiles in Bulgaria, according to word received this week by the U. S. Department of Commerce. One Italian firm in Sofia is offering 16 to 18 months' credit and a French firm 13 months' credit.

As a result American automobile exporters are facing very keen competition. American firms in Bulgaria are selling strictly on a cash basis, throwing the burden of financing upon the shoulders of the dealers. Only 80 American machines have been sold in Bulgaria during the past year, but this is regarded as good in the face of conditions.

A fleet of 150 taxicabs has been acquired during the past six months by individuals and companies in Sofia, and other Bulgarian cities will follow suit.

Chapin to Address Pan-American Group

WASHINGTON, April 19—Roy D. Chapin, president of the National Automobile Chamber of Commerce, will be one of the principal speakers before the Pan-American Conference, meeting here from May 2 to 5. He will address the conferees on Tuesday, the second day of the conference, on the value of transportation facilities.

Approximately six delegates from Latin-America will be in attendance. Also there will be a hundred or more business men, exporters, etc., of this country who will meet with the visitors from South America. The primary purpose of the conference is to weld closer ties and secure for each country larger export business.

Mr. Chapin will outline to the delegates the progress that has been made in this country from an adequate highway system and the economic value to the country of motor transportation. He will also stress how means may be provided for similar development in Latin-America, touching on financing of highways, their construction and will offer the cooperation of the automobile industry to this end.

Seven American Cars High in Swedish Test

WASHINGTON, April 16—Seven out of nine cars which finished the Royal Automobile Club's recent 900-mile contest through the middle of Sweden from Goteborg to Stockholm with perfect scores were of American manufacture, the other two being Fiats, it was announced here this week by the U. S. Department of Commerce.

Increases Compensation

DETROIT, April 18—All manufacturers and dealers employing labor in the automotive industry in Michigan will be affected by a new compensation bill which has just been passed by the Michigan legislature and which has now gone to Gov. Fred W. Green for signature. The bill increases the maximum compensation for disability from $14 a week to $18 and provides other changes. The bill had the backing of the administration.

McGill Opens Branch

CLEVELAND, April 16—The McGill Metal Co. has opened a Schubert bearing retail store at 2027 E. Seventieth St., with Robert Miller as manager.

Hydraulic Drive Features New Car

Conventional Driving Units Are Replaced by New System—Efficient in Tests

DETROIT, April 15—A new and radical type automobile will be produced by the Port Huron Corp. in the plant of the Port Huron Engine & Thresher Co., if present plans are carried out.

According to G. L. McMullen, Chicago attorney, representing interests in the new project, the car which the company contemplates building will have no brakes, clutch or geared transmission. These conventional units will be displaced by a hydraulic transmission. Three working models of the car have been made and, according to Mr. McMullen, hydraulic engineers of the University of Michigan who have given the car close scrutiny, declare it 97½ per cent efficient.

Power from the gasoline engine is transferred to the rear wheels by means of a hydraulic pump located in the position usually occupied by the transmission. The forward drive, as this device is called, pumps oil under pressure exceeding 1000 lb. to the square inch into the driving mechanism directly connected to the rear wheels.

Mr. McMullen said the corporation has not definitely decided just when production will be started on the new car or what output the organization hopes to obtain. At any rate it will be several months before production plans can begin to take form, he said. These plans will be announced later.

The corporation is organized under the laws of Illinois for $1,000,000 common stock at $100 par. The officers are Owen J. Stocking, Chicago, president; E. L. Wilson, Port Huron, vice-president and general manager, and Herbert N. Ewing, Chicago, secretary and treasurer.

Offers New Ferrous Metal

CLEVELAND, April 18—C. F. Mead, president of the Fulton Foundry & Machine Co., announces that his company will market a new ferrous metal for castings that has all the inherent and desirable qualities of gray iron, the hardness of white iron, the physical specifications of steel and the wearing quality of manganese steel. It can be machined, then hardened by heat treatment, like tool steel, to give a Brinell of 350 to 600 as desired. It is further claimed that it will not chip or sprawl.

Reports Ohio Sales Lower

CLEVELAND, April 19—Automobile sales in Ohio decreased 12.5 points in March 1927 as compared with March 1926 according to Dr. Spurgeon Bell, director of the bureau of business research, Ohio State University.

Canadian Dealers to Share Million

OTTAWA, April 19—Within the next few days automobile dealers will receive checks in settlement of old claims for return of luxury tax. About six years ago a luxury tax was put on cars and afterwards removed. Dealers who had paid the tax on unsold cars claimed a refund. Provision was made in last year's estimates for a refund, but dissolution prevented the voting of the money. The situation has now been regulated and refund checks are being prepared, which total over $1,000,000. About 2000 dealers will participate.

British to Impose 33% Tax on Tires

WASHINGTON, April 18—A duty of 33 1/3 per cent will be imposed on automobile and motorcycle tires imported into the United Kingdom under the tariff schedule included in the new British budget, the rubber division of the U. S. Department of Commerce announced here this week.

The United Kingdom, it was reported, is the largest single market for tire exports from the United States, Canada, France, Italy and Germany. During 1925 the United States shipped 185,000 casings, valued at $2,200,000 to the United Kingdom and in 1926 152,000 casings valued at $2,500,000.

U. S. Ships 80 Per Cent of French Car Imports

WASHINGTON, April 18—The United States again retained the lead in shipments of automobiles to France in 1926, according to advices received this week by the U. S. Department of Commerce. More than 80 per cent of all imports of passenger cars into France during the past year came from this country, on the basis of imports by weight.

Italy holds second place among nations shipping automobiles to France, with Great Britain third and Belgium fourth. Total passenger car imports into France for the year were valued at 142,250,000 francs, while French automotive vehicle exports were valued at more than 2,347,623,000 francs.

Ford Projects Air Line

DETROIT, April 18—Reports here indicate that a new airline is to be inaugurated shortly by the Ford Motor Co. It would connect Winnipeg with Minneapolis and St. Paul, thence to Detroit, Cleveland, Youngstown, Pittsburgh, Cumberland, Md., with the final terminus in Philadelphia. Both Ford freight and air mail will be carried.

German Group Seeks De Dion Purchase

Officials of Oldest French Automobile Firm Consider Mercedes-Benz Offer

PARIS, April 9 (*by mail*)—Negotiations for the purchase of the De Dion Bouton Company, the oldest automobile firm in France, by a group of German financiers representing the Mercedes-Benz Company, are in an advanced condition. Officials of the De Dion Bouton company, seen in Paris, refuse to make any statement, but admit that German negotiations have been received and that their offer is being given consideration. From private sources it has been learned that the offer is looked upon favorably and that there is a possibility of it being accepted.

Established in 1882, and thus being the oldest firm in France, if not in Europe, devoted exclusively to automobile construction, the De Dion Bouton company went into liquidation two months ago. The works were closed for a month, but production has since been resumed on a small scale. Attempts have been made to refloat the company, one of the most important offers being made by Lucien Rosengart, vice-president of the Peugeot Company, but when an agreement appeared to have been reached the Peugeot-De Dion Bouton negotiations were broken off.

Backed by Deutsche Bank

Names of German negotiators have been kept secret; it is known, however, that the Mercedes-Benz Company has the backing of the Deutsche Bank, the Commerz Privat Darmstaedter, the National Dresdner, and the Marx Goldschmidt of Mannheim. The French Government is acquainted with these negotiations and is raising no objection; it is understood, indeed, that one of the principal movers in this matter is a member of the French Council.

Since 1914 Germany has had no interests in the French automobile industry and practically no German automotive goods are sold in France. Prior to the war Mercedes maintained a small factory organization a few yards from the De Dion Bouton factory, but this was seized in 1914 and has since become a Government arsenal.

Plan London-Paris Seaplanes

WASHINGTON, April 16—Airplane passenger lines operating from the Croydon Airport, London, during the calendar year 1926 carried 26,500 passengers and made a total of 5446 trips, it was reported to the U. S. Department of Commerce this week.

An experimental seaplane service from London to Paris is being planned to reduce the total distance from center to center of the cities, owing to the necessity of establishing landing fields outside the cities.

Industry Maintains Steel Buying Pace

Steel Demand as Whole, However, Reported Slowing —Prices Hold Firm

NEW YORK, April 21—While there is a perceptible slowing down of steel demand as a whole, automotive consumers continue to place orders for nearby deliveries with very little change in aggregate volume. Perhaps nothing is more impressive in the steel market at this time than the contrast between full-finished automobile sheet demand and that for ordinary sheets. Rollers of full-finished automobile sheets have sufficient orders to keep finishing departments fully busy, while much irregularity prevails in the remainder of the sheet field.

Prices for full-finished automobile sheets hold firm. Those for ordinary black sheets continue more or less ragged. With somewhat less business overhanging the strip-steel market, prices, especially for hot-rolled strip, show a more steady tendency. Some of the large Mahoning Valley strip mills are scheduled to suspend operations from the middle of May until the middle of June for mechanical improvements.

Automotive alloy steel producers are operating at a fair rate. Quite a few automotive consumers still have steel bar tonnages due them on contracts placed last month. Cold-finishers of bars enjoy a steady routine business at unchanged prices.

So far as the steel market itself is concerned, recurring rumors of mergers cause relatively little stir. The latest line-up of companies mentioned as prospective constituents of the new consolidation would sort of give to the steel industry a "Big Four," instead of the present formation in which the leading interests and two large independents are generally assumed to be the dominant factors. There has been no occasion of late for any of these to set the pace in price policies.

Runaway market conditions, such as occurred periodically a few years ago and which usually caused the leading interests to put on the brakes at the critical moment, are hardly to be thought of today. The steel market is not, as one hears so frequently these days, a buyers' affair, but one in which prices are made by a very fair balance of power, buyers and sellers being more nearly on an even footing than they have been in a long time.

Pig Iron—The market continues quiet. Automotive foundries have provided for their second quarter requirements, and are not giving very much thought to plans beyond June. Prices are entirely unchanged.

Aluminum—No developments of importance are to be noted. Imports continue along unchanged lines, but representatives of foreign producers are intensively striving to extend the outlet for their metal, all of the Continental countries expecting a considerable increase in production this year. A fair demand is noted from accessory manufacturers for odd lots. Prices continue on an even keel, with the outside market a fraction under the quotations of the sole domestic producer.

Copper—Producers say that a large buying movement is overdue and that there is somewhat more demand is shown by sales and inquiries this week. Curtailed production is obviously a temporary affair, as some of the producers are preparing to speed up on output. Detroit and Connecticut brass mills are fairly busy on automotive orders.

Tin—Consumers bought what they needed urgently while the market was around 68c. The London market was closed on Monday, a bank holiday.

Lead—The market is dull and easy.

Zinc—Slow recovery following recent weakness is in evidence.

Eaton Election Held Steel Merger Step

CLEVELAND, April 18—The financial district here regards the election of Cyrus S. Eaton and associates to the board of directors of the Republic Iron & Steel Co. as another step toward another large steel merger. Republic is one of the largest in the independent field.

Eaton interests now control Trumbull Steel, Warren and Central Alloy of Canton and Massillon. Leading interests in Pickands, Mather & Co. and the Cleveland-Cliffs Iron Co. are with Eaton in control of these companies.

Guesses here as to where the expected merger will finally end range from an entirely new line-up of independents to a combination of those independents either with Bethlehem Steel or Youngstown Sheet & Tube. Both Youngstown Sheet & Tube and Otis Steel have a Mather interest but there is no indication that Otis is to be included.

Reelection of Howard M. Hanna to the board of Republic is in line with a long-standing relationship between the M. A. Hanna Co. and Republic.

Dayton Forms A. S. S. T. Chapter

CLEVELAND, April 20—A chapter of the American Society for Steel Treating has been formed at Dayton with 102 members. Officers elected for the year are G. J. Oswald, chairman; O. Z. Klopsch, vice-chairman; F. M. Reiter, secretary-treasurer. Members of the executive committee are E. C. Carter, H. H. Skinner, R. G. Rogers, H. M. Williams, T. J. Mullen, C. E. Merrill and F. T. Sisco. The next meeting of the chapter will be on April 18.

Zapon Offices at Factory

NEW YORK, April 20—The Zapon Co. has removed its general offices from 247 Park Ave., New York, to the plant at Stamford, Conn., where a large administration building recently was built. General sales offices likewise are removed to the plant, an office and warehouse being continued in New York to serve the metropolitan district only.

Ohio Parts Jobbers, Manufacturers Unite

Credit Information Exchange and Merchandising Cooperation Among Activities

CLEVELAND, April 16—Manufacturers and jobbers of replacement automobile parts in northern Ohio formed the Northern Ohio Parts Association at a meeting this week in the Winton Hotel. The association will have its headquarters in Cleveland. The new organization had its inception at a meeting held last month at which E. P. Chalfant and Robert MacFee, both of Detroit and executives of the National Standard Parts Association, met parts manufacturers and jobbers here.

The first activities of the new association will be the exchange of credit information and merchandising cooperation. Headquarters will be in the offices of the Cleveland Automobile Manufacturers & Dealers Association, the Automotive Boosters Club and the Cleveland motor finance clearing house.

Officers of the Northern Ohio Parts Association are: President, Ira Saks, Accurate Parts Mfg. Co.; vice-president, H. J. LaFaye, Motor Rim Manufacturers Co.; secretary, Herbert Buckman; treasurer, W. P. Burrer, Aberdeen Motor Supply Co. The board of directors is made up of the officers and the following: L. A. Dall, Dall Motor Parts Co.; J. L. Zismer, Automotive Parts Co., and N. M. Carl, Buckeye Brass & Mfg. Co.

Start Tire Fabric Plant

ATLANTA, April 19—Announcement is made by the southern branch of the Goodyear Tire & Rubber Co. of the starting of production in the company's tire fabric plant at Cedartown, Ga., known as the Goodyear Clearwater Mills, and owned jointly by the Goodyear company and the Firestone Tire & Rubber Co., to produce tire fabric for these two companies.

To Build Chain Factory

CAMDEN, TENN., April 19—Announcement is made by J. A. Cole, head of Coles Automobile Mud Chain Co., Inc., of Camden, that the company will at once start the construction of a new plant to be equipped with machinery for the manufacture of automobile chains, and to be completed some time during the early part of the coming summer.

Canada Awards Contracts

WASHINGTON, April 20—Highway contracts exceeding $3,000,000 have been awarded by the Canadian government, it was reported this week to the U. S. Department of Commerce. The contracts were divided among four Toronto construction companies.

Indiana Holds First Production Session

Chromium Plating is Leading Topic — Engineers Visit Marmon Eight Plant

INDIANAPOLIS, April 16—The first production meeting of the Indiana Section of the Society of Automotive Engineers held last night proved the largest and the most successful meeting of the season for the section. More than 200 heard the papers while over 100 section members and engineers from over the state were present for the dinner before the meeting in the evening. For the first time an afternoon session was also held, section members being conducted through the new plant by Marmon engineers who described the features of the progressive production by which more than 100 Marmon eights are produced each day in limited space, originally designed for smaller production.

The papers presented during the evening session were by G. H. Freers, assistant chief engineer of Marmon, who spoke of the relations of design to production and the newer problems presented to the engineer by progressive production. W. K. Swigert, production manager of the Stutz Motor Car Co. of America, Inc., presented a paper which set forth clearly the varying types of modern production called for by different types of cars.

The feature paper of the evening in interest aroused and questions asked proved to be "Chromium Plating" presented by C. H. Humphries, of the Metals Protective Corp. of Indianapolis. This paper gave a very clear presentation of chromium plating and the manner in which it has been developed. Mr. Humphries showed some of the varying uses to which chromium plating may be put, and some of its limitations as well. Samples of chromium-plated parts were exhibited that have stood up in the hardest sorts of service very much longer than other types of materials and finishes have demonstrated. In the questions following the papers other engineers present told of other uses in which the process has been successful.

The session ended with the presentation of the four-reel Norton motion picture showing grinding processes in all sorts of production plants.

Elects New Officers

In the business meeting held just after the dinner and before the open meeting the following officers were elected for next season: Section chairman, George H. Freers, Marmon; vice-president, Ralph R. Teetor, Perfect Circle Co., Hagerstown; secretary, Raymond F. Buckley, consulting engineer, Indianapolis, and treasurer, C. A. Trask, chief engineer, Rockford Mfg. Co., Indianapolis. F. F. Chandler, vice-president of the Ross Gear & Tool Co., of Lafayette, was chosen delegate to the nominating committee of the S.A.E., and Mr. Buckley, alternate.

Chairman Teetor announced that the May meeting will be held as a joint session with the engineering men of Purdue University of West Lafayette at the university where the visiting men will inspect the important research establishment of the university and other features. Announcement was also made by a member of the Dayton section which sent a delegation to the meeting of the next Dayton meeting and an invitation was extended to Indiana men to attend that meeting.

California S.A.E. Hears Road and Bridge Talks

SAN FRANCISCO, April 16—Highway construction and San Francisco Bay bridges were the two subjects occupying the attention of the Northern California Section of the Society of Automotive Engineers at its monthly meeting and banquet this week at the Commercial Club, San Francisco.

"Traffic Requirement in Highway Design" was discussed by a representative of the highway bureau of the California State Automobile Association. "Carquinez Bridge and Its Economy as Applied to Automotive Transportation" was the subject of Professor C. Derleth, Dean of the College of Engineering of the University of California. Both addresses were illustrated with slides, and other entertainment was provided by the committee and by W. S. Crowell, secretary of the section.

Lewis Gets Gold Medal

PHILADELPHIA, April 21—Wilfred Lewis, president of the Tabor Mfg. Co., whose formula for the strength of gear teeth has been used throughout the world for more than 30 years, has been awarded the gold medal of the American Society of Mechanical Engineers "in recognition of his contributions on the design and construction of gear teeth." Mr. Lewis' most recent contribution to the art is the design of a machine for testing gears under dynamic load.

Spicer Earns $341,307

NEW YORK, April 21—Earnings of Spicer Mfg. Corp. for the quarter ended March 31 were $341,307 after depreciation and other expenses but before Federal taxes. This compares with $520,579 for the 1926 quarter. The company has 28,000 shares of 8 per cent cumulative preferred and 313,750 shares of no par common, outstanding.

Spain Car Imports Gain

WASHINGTON, April 19—While automobile imports into Spain in 1926 increased to $20,532,000 as compared with $15,312,000 in 1925, the general Spanish trade showed an unfavorable balance for the year of $96,800,000, it was announced this week by the U. S. Department of Commerce.

Rules State Right to Regulate Roads

Supreme Court Finds No Power to Proscribe Police Highway Authority

WASHINGTON, April 21—The right of a state to regulate the maximum loads to be carried by motor vehicles over Federal-aid highways within the state was upheld by the Supreme Court of the United States this week in a decision in the case of Morris et al. v. Duby et al. The validity of state regulations involved in the case was fully upheld by the Supreme Court.

In this case the plaintiffs were the owners and operators for hire under state license, of motor trucks on the Columbia River highway, Oregon. Regulations of the state required that motor trucks should not carry a combined maximum load in excess of 22,000 lb. The highway commission, under authority of the laws of Oregon, reduced the maximum to 16,500 lb.

The plaintiffs applied for an injunction to prevent enforcement of the order, declaring that it invaded their constitutional rights and was unreasonable, arbitrary and discriminatory, as they were in competition with steam railroads and charged rates of traffic which, under the 16,500 lb. restriction, would prevent their doing business except at a loss.

The Supreme Court ruled that there is no provision in the Constitution or acts of Congress which would withhold from the states their ordinary police power to prescribe regulations for the use of highways which would preserve them in the interest of the public.

The decision of the lower courts in refusing to grant an injunction against the carrying of the regulations into effect was affirmed.

Piston Ring Sets Record

MUSKEGON, April 20—The Piston Ring Co. reports shipments of 5,083,117 rings in March, the largest month's business in the history of the company. Sales to jobbers during the first quarter of the year were 500,000 more than during the first quarter last year. Total shipments of the company in 1926 totaled 43,115,348 rings. With the new additions to the plant, capacity has been increased to about 70,000,000 rings yearly.

Plan Aircraft Exhibits

CLEVELAND, April 19—The Glenn Martin Co. and the Leece-Neville Co. both of Cleveland will be exhibitors at the aircraft show and demonstration to be staged in Washington, May 2 to 5. Other exhibitors from Ohio will be the Advance Aircraft Co. of Troy; Johnson Airplane Supply Co. of Dayton; B. F. Goodrich Rubber Co., and the Natural Steel Products Co., Dayton.

Trade Code Framed by Battery Makers

CHICAGO, April 16—At a recent meeting of battery manufacturers in Chicago with representatives of the National Better Business Bureau a number of recommendations were adopted for the purpose of improving trade conditions in the battery industry.

The recommendations adopted are as follows:

1. **Make sure that every battery is appropriately and correctly rated.**
2. **Brand each battery with the correct rating figure, or with maker's name and type or symbol number from which the rating may be determined. Preferably this branding should be on the box itself, at least on the name-plate or other exposed part.**
3. **In each catalog or piece of advertising matter, advise dealers of the rating method employed and what any type or symbol numbers used may mean.**
4. **Decline to misbrand batteries made for others, or to deliver batteries in over-size boxes unless marked with correct capacity rating in plain figures.**

Colleges Get Old Aircraft

WASHINGTON, April 16—In compliance with the act of Congress providing that properly accredited educational institutions be given obsolete aircraft or aircraft parts for use in aeronautical courses, but not in actual flight, the U. S. Navy Department announced this week that it has issued obsolete aircraft motors to the University of Nebraska, Lincoln, and the Worcester Polytechnic Institute, Worcester, Mass.

Coming Feature Issues of Chilton Class Journal Publications

May 1 — Automobile Trade Journal—Annual Big Small Town Market Number.

May 5 — Motor Age — Annual Sales and Service Reference Number.

June 4—Automotive Industries —Engineering Number.

June 10—Motor World Wholesale—A.E.A. Summer Meeting Number.

Fatal Accidents Increase 18% in First Two Months

NEW YORK, April 18—Fatal accidents in cities of more than 100,000 population in the first two months of 1927 totaled 876 against 741 in the corresponding period a year ago, a gain of 18 per cent, according to figures gathered by the National Automobile Chamber of Commerce.

The figures may or may not be an index of the trend for the year, the Chamber points out, since weather conditions have a marked effect on totals. During the winter months the 1926 totals were very low during the winter but the year showed an increase.

D.A.D.A. Admits Used Car Dealers

DETROIT, April 16—Used car dealers of high standing are now eligible for membership in the Detroit Automobile Dealers Association as a result of action taken at the annual meeting, last night in the General Motors Building. Several changes were also made in the by-laws to improve the working details of the organization.

Lockhart's 164 m.p.h. to Stand as Record

WASHINGTON, April 16—While the contest board of the American Automobile Association has not yet passed formally upon affidavits relating to a world speed record in 91½ cu. in. Miller claimed for Frank Lockhart on the Dry Lake Course at Muroc, Cal., April 11, the board expresses the opinion that the Lockhart record of 164.009 m.p.h. will be confirmed.

With the wind Lockhart maintained a speed of 171.021 while against the wind he was clocked at 157.549, making his mean miles-per-hour speed 164.009.

Major H. O. D. Segrave drove his 1000-hp. Sunbeam at a speed of 203.79 m.p.h. on Daytona Beach, March 29. In this connection the contest board remarks that Major Segrave's engine was 30 times the size of the one employed by Lockhart.

Italy Favors U. S. Goods

WASHINGTON, April 16 — Italy during 1926 imported more goods of all kinds from the United States than from any other country, the imports including automobiles and tractors valued at 60,000,000 lire, according to a report received this week by the U. S. Department of Commerce from its commercial attache at Rome. Total shipments from the United States to Italy during the year were valued at 5,614,000,000 lire or about $270,033,000 at current rates of exchange.

To Manufacture New Rim

CLEVELAND, April 18—The Roffman Rim Co., formerly of Toledo, has leased 600 ft. of floor space in the Stanton Ave. National Acme plant and will manufacture a collapsible automobile rim.

Calendar of Coming Events

SHOWS

Barcelona .....April 27-May 8
Budapest .....June 4-15
Cleveland .....Sept. 19-23
Exposition, Public Auditorium, National Machine Tool Builders' Assn.
Cleveland .....Oct. 3-7
Exhibition, Public Auditorium, American Electric Railway Ass'n.
Cologne .....May 20-31
International Commercial Transport Exhibition.
London .....Oct. 14-22
Olympia Passenger Car Show.
London .....Nov. 17-26
Olympia Truck Show.
Melbourne .....May
International Motor Show.
New Haven, Conn. .....Sept. 6-9
Machine Tool Exhibition.
Paris .....Oct. 6-16
Grand Palais.

CONVENTIONS

American Automobile Association, Bus Division Meeting, Bellevue-Stratford, Philadelphia.....June 15
American Automobile Association, Annual Meeting, Ritz-Carlton Hotel, Philadelphia .....June 16-17
American Drop Forging Institute, French Lick Springs, Ind...May 17-19
American Electric Railway Association, Public Auditorium, Cleveland..Oct. 3-7
American Gear Manufacturers Association, Annual Meeting, Hayes Hotel, Jackson, Mich. .....May 12-14
American Society for Steel Treating, Convention Hall, Detroit....Sept. 19-24
American Society of Mechanical Engineers, White Sulphur Springs, W. Va. .....May 23-26
American Welding Society, Engineering Societies Bldg., New York City .....April 27-29
Associated Automotive Engine Rebuilders, Hotel Winton, Cleveland .....May 26-28
Automotive Equipment Association Summer Convention, Multnomah Hotel, Portland, Ore...June 27-July 2
Chamber of Commerce of the United States of America, Washington, May 2-5
National Association of Automobile Show and Association Managers, Drake Hotel, Chicago.....July 26-27
National Foreign Trade Council, Hotel Statler, Detroit .....May 25-27
National Hardware Association, Metal Branch, Hotel Cleveland, Cleveland .....May 5-6
National Safety Council, Stevens Hotel, Chicago .....Sept. 26-30
Overseas Automotive Club, Luncheon Meeting, Hotel Empire, New York City .....May 12
Society of Industrial Engineers, Hotel Stevens, Chicago .....May 25-27
United States Good Roads Association, Savannah, Ga. .....June 6-11

N. A. C. C.

New York, May 31—Truck Members Meeting.
New York, June 2—Annual Meeting.

S. A. E.

National

Chicago, November—National Transportation and Service Meeting.
Chicago, Dec. 1—Tractor Meeting.
Cleveland and Detroit, Sept. 19-22—Production Meeting.
French Lick Springs, Ind., May 25-28—Summer Meeting.

Sectional

Buffalo, April 25-26—Aviation and Aeronautics—Joint meeting with Aeronautic Division American Society of Mechanical Engineers. Inspection trips.
Detroit, April 27-28—Reducing Avoidable Waste in Production—Joint meeting with American Management Association.

RACES

Abilene, Texas .....July 4
Altoona, Pa. .....June 11
Altoona, Pa. .....Sept. 5
Atlantic City .....May 7
Atlantic City .....Sept. 24
Belgian Grand Prix, Spa-Francorchamps .....July 9-10
British Grand Prix, Brooklands.....Oct. 1
Charlotte, N. C. .....July 11
Detroit .....Sept. 10
French Grand Prix, Montlhery.....July 3
Indianapolis .....May 30
Los Angeles .....Nov. 27
Salem, N. H. .....June 25
Salem, N. H. .....Oct. 12
Syracuse, N. Y. .....Sept. 3